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VOL. I

E.B.H.

ILAM HALL.

Plate at p33 (should be at 51)

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A VIEW
OF THE
PRESENT STATE
OF
DERBYSHIRE;

WITH AN ACCOUNT
OF ITS MOST REMARKABLE
ANTIQUITIES;

ILLUSTRATED BY
AN ACCURATE MAP AND PLATES.

IN TWO VOLUMES.

VOL. I.

By JAMES PILKINGTON.

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PREFACE.

TRUTH and accuracy ſhould be objects of the firſt moment in the execution of every literary undertaking; and I hope, it will be found, that I have not been regardleſs of their importance in either of the volumes, which I now ſubmit to the inſpection of the public. But I do not expect, notwithſtanding the pains and care, which have been taken, that they are free from errors. In collecting materials, I may inadvertently have fallen into miſtakes myſelf, or been miſinformed by others. Should any errors be diſcovered, I ſhall eſteem it a favor, if thoſe, by whom they are perceived, will, by letter, or in any other way, point them out with candour and civility.

I doubt not, but that to ſome readers the plan of this work will appear defective. Thoſe, who may expect to ſee it formed after the model of Dugdale, Thoroton, Chauncy, and other writers of the ſame deſcription, will certainly be diſappointed. On the ſubjects of armoury, genealogy, hiſtory, and antiquities, they will find, that much has been omitted. A complete inveſtigation of theſe points would have been too laborious and expenſive an undertaking. It would have been alſo an unneceſſary application of my time and attention, as I have been informed, that an eminent antiquarian, through the chief period of a long life, has been engaged in preparing a work of this kind for the preſs.

There is another claſs of readers, whoſe approbation I have but little hope of obtaining. In the opinion of ſome I may have gone to the other extreme; I may have been too minute, and prolix. Thoſe, who are well acquainted with ſubjects of natural hiſtory, will probably think, that what is contained in the firſt volume, might have been comprized in a much ſmaller compaſs. But tho' many things are noticed, which to men of ſcience may appear unworthy of attention, yet it is preſumed that to perſons of inferior attainments in knowledge, they will be new and intereſting. Nor is there, I apprehend, any room to doubt, whether there is not a conſiderable majority of the latter claſs of readers.——Perhaps it will alſo be thought, that in the ſecond volume the account, which is given, of the ancient and preſent ſtate of towns, villages, churches, religious houſes, caſtles, ſeats, families, ſtate of population, arts, manufactures, cuſtoms and manners is too particular. But I flatter myſelf, that it will not be found tedious by thoſe, who have a taſte for enquiries reſpecting theſe different topics. If in this inſtance I have failed of giving ſatisfaction, much uſeleſs pains and expence have been beſtowed upon this part of the undertaking.

With a view of giving as clear an illuſtration of this work as poſſible, it is accompanied with a map and three plates. The map is a diminiſhed copy of that, which, about twenty years ago, was publiſhed by Mr. Burdett from an actual ſurvey of Derbyſhire at that time. It is corrected to the preſent ſtate of the county, and deſigned to give a clearer idea of ſome ſubjects, which are diſcuſſed in this work, than any form of words could convey. The canals have been introduced, the courſe of the new turnpike roads has been marked, and the extent of the beds of limeſtone and coal has been diſtinguiſhed by two different lines, ſurrounding each of them.

During ſeveral years a conſiderable portion of time and attention has been given to the collection and arrangement of the materials, of which this work conſiſts. My enquiries have been carried into every part of the county; and to ſome places repeated excurſions have been made, that the moſt full and accurate information might be obtained.

I ſhould be wanting in gratitude, if I neglected to acknowledge the civilities, which I have received, in proſecuting my reſearches in different parts of the county. Tho' I was frequently an entire ſtranger, very ſmall is the number of inſtances, in which the requeſted information was withheld.

There are a few gentlemen, to whom I am under more eſpecial obligations. In what particular way they have communicated their aſſiſtance will be generally ſeen from the parts of the work, in which their names are mentioned. However I take the liberty of pointing out more diſtinctly the chief favours, which I have received. In the mineralogical part,

part of the work Peter Nightingale of Lea, eſq; has been ſo kind, as not only to furniſh me with ſeveral valuable remarks himſelf, but has been the means of procuring information from other perſons, engaged in mineral purſuits. The public will ſee, how much I am obliged to Dr. Darwin, of Derby, for his natural hiſtory of the Buxton and Matlock waters. I am in no ſmall degree indebted to the Rev. Dewes Coke of Brookhill-hall near Mansfield, for his catalogue of plants, growing ſpontaneouſly in this county. I beg alſo, that the Rev. Richard Gifford of Duffield, and the Rev. Samuel Pegge of Whittington will accept of my grateful acknowledgments for their obliging anſwers to the enquiries, which I have made reſpecting the antiquities of Derbyſhire. Nor would I omit to mention, that my thanks are due to Mr. David Harriſon late of Doveridge for his uſeful extracts from books on the ſame ſubject.

DERBY, *July* 1789.

CORRECTIONS.

Vol. I. p. 146, line 8, ſtrike out *the crown, but are leaſed by.*
Vol. I. p. 472, l. 14, for *acceſſible*, read *inacceſſible.*
Vol. II. p. 49, l. 4, for 25,206, read 25,895; and for 124,465 read 120,465.
Vol. II. p. 51, l. 29, for 1350, read 1600 *beſides thoſe employed by the hoſiers of Nottinghamſhire.*
Vol. II. p. 303, l. 1, for *them*, read *the cyllinders.*

CON-

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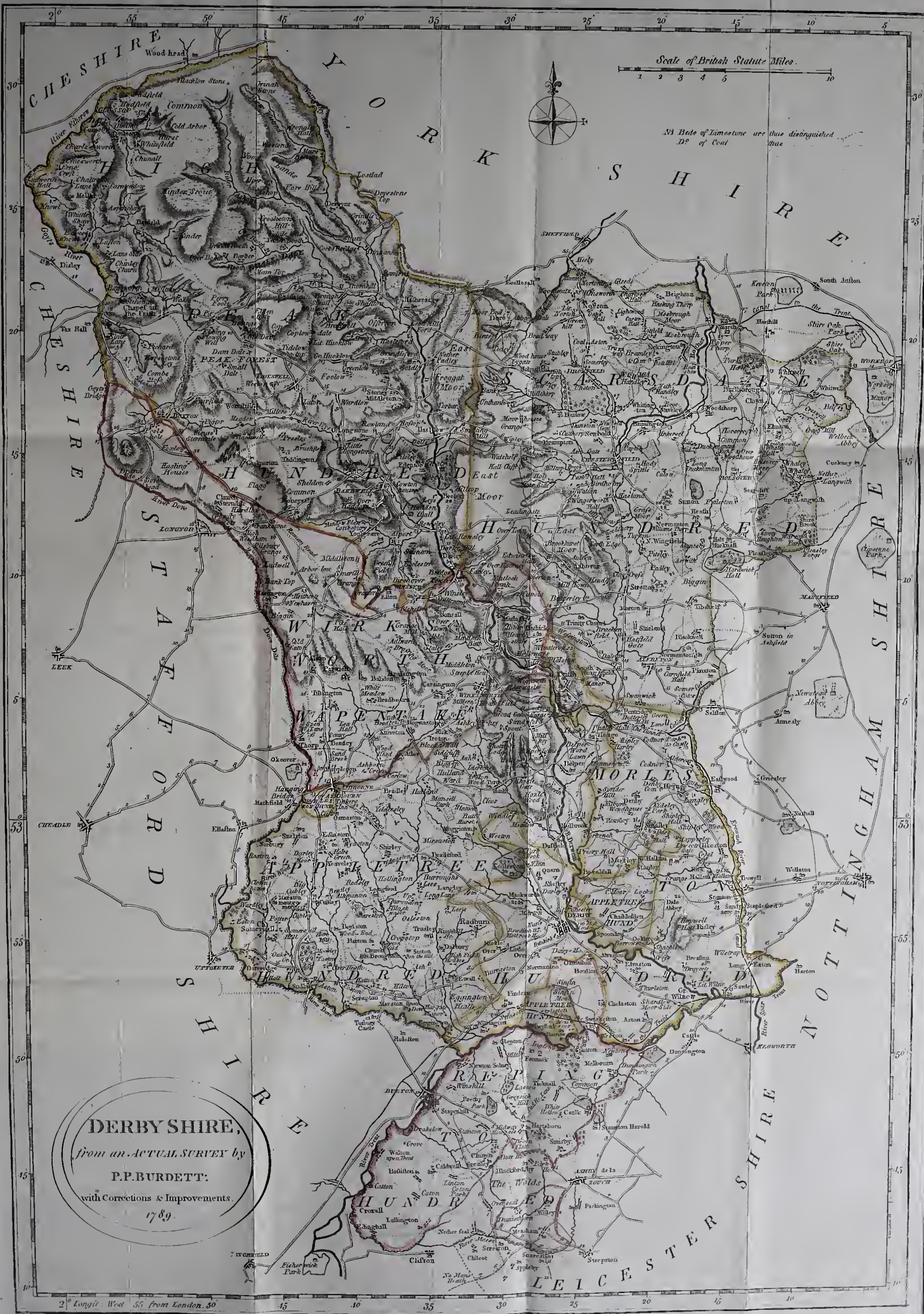

DERBYSHIRE,

from an ACTUAL SURVEY *by*

P.P. BURDETT:

with Corrections & Improvements.

1789.

A VIEW

OF THE PRESENT STATE OF

Derbyſhire, &c.

CHAP. I.

The ſituation, boundaries, figure, extent, and general ſurface of the county.

DERBYSHIRE lies nearly in the middle of England. It is not eaſy to ſay, whether its diſtance from the eaſtern or weſtern coaſt is the greateſt. But it is evidently ſituated ſomewhat nearer to the northern than the ſouthern extremity of the kingdom. According to the obſervation of Mr. Flamſtead,* the latitude of Derby is 52 degrees and 57 or 59 minutes, and the longitude 5 or 6 minutes weſt from London.

It is bounded by Nottinghamſhire and a part of Leiceſterſhire on the eaſt, by another part of

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* Phil. Tranſ. abridged by J. Lowthorp, V. 1, p. 560.

of the latter county on the ſouth, by Stafford-ſhire and Cheſhire on the weſt, and by York-ſhire on the north.

The form of the county is extremely irregular. If it bears a reſemblance to any determinate figure, it is to that of a triangle. But the likeneſs is rendered very imperfect by the numerous curves and projections, which appear in the lines, by which it is bounded.

Derbyſhire is a county of moderate extent. Its greateſt length from north to ſouth is about 55; its greateſt breadth from eaſt to weſt about 33; and its circumference about 204 miles. Theſe calculations are founded upon Mr. Burdett's ſurvey. The ſcale, by which he has conſtructed his map, is that of an inch to a mile; and by converting the number of inches into miles, the extent of the county may be aſcertained with a tolerable, and perhaps ſufficient degree of accuracy.

There are very few counties in England, the general ſurface of which exhibits ſo irregular an appearance, as that of Derby. Indeed the ſouthern and northern parts of it are a ſtriking contraſt to each other. The former is not particularly remarkable for its hills and valleys.

Whereas the latter is diſtinguiſhed in an eminent degree by a long and continued ſucceſſion of both.

In this part of the kingdom the country begins gently to riſe into hills, which in their progreſs to the north ſwell gradually into mountains. Theſe extend in one great chain to the ſouthern extremity of Scotland. They firſt divide Lancaſhire from Yorkſhire. Then entering Weſtmoreland, they ſpread over the whole face of that county, and a part of Cumberland. After this, they contract again into a ridge or chain, and form the limits betwixt Cumberland and Northumberland. Continuing their direction northward, they at length enter Scotland.

Theſe mountains in their courſe are diſtinguiſhed by many different names, and vary conſiderably from each other in their reſpective elevation and circumference. Ingleborough in Yorkſhire has been eſtimated at 20 miles in circumference at its baſe,|| and 600 Yards in height above the neighbouring valley; and the mountains of Kelwellin and Skiddon are, according to the plan of Mr. Smeaton,§ elevated 1000 yards above the valley lying betwixt them.

In reſpect to that part of Derbyſhire, where theſe high lands begin, it may be proper to obſerve,

|| Annual Regiſter, 1761, p. 100.
§ Phil. Tranſ. Vol. 65, part 2, p. 498.

obſerve, that tho' the mountains may not be equal in height or extent to thoſe, which have now been mentioned, yet they approach nearer to them, than may at firſt ſight be imagined. The ground in the ſouthern extremity of the Peak gradually riſing into hills, and theſe lying one beyond another in a continued ſeries, a common traveller can ſcarcely form an accurate idea of their elevation above the ſurrounding country. However, of this he becomes fully ſenſible, when he begins to deſcend into the neighbouring weſtern counties. In ſome particular ſituations, the proſpects into Cheſhire and Lancaſhire are remarkably diſtant and extenſive.

The two higheſt eminences in the north-weſt part of Derbyſhire are Ax-edge, and Kinder-ſcout. The former, which is ſituated about three miles ſouth-weſt of Buxton, is, according to the calculation of Mr. Whitehurſt † about 2100 feet higher than the town of Derby, and 1000 feet above the valley in which Buxton-hall ſtands. But the exact height of the latter mountain has not, I believe, been aſcertained. It is however generally ſuppoſed to have a greater elevation, than any other eminence in the county. Though ſurrounded by hills on every ſide, it overlooks them all, and furniſhes a moſt magnificent and delightful proſpect. I am informed, that with the naked eye may be ſeen from it the towns of Stockport, Mancheſter, Bury, and Bolton, the range of hills near Darwent, Rivington Pike, the towns of Wigan and Warrington, and the hill near Liverpool, the city of Cheſter, and ſome high mountains in North-Wales.

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† Note to Dr. PEARSON's Account of Buxton Waters.

That the mountains of Ax-edge and Kinderſcout have a greater elevation, than any part of the neighbouring country, is manifeſt from obſerving, that the clouds frequently reſt upon their ſummit, when they paſs over the high land, with which they are ſurrounded. This circumſtance cannot be aſcribed to any other cauſe than that now mentioned. Nor could it be perceived, unleſs theſe eminences were conſiderably higher, than any other in this part of the country.

There is another ridge of high ground, which begins to appear about a mile to the ſouth of the village of Crich. It extends northward from hence along the eaſt ſide of the river Derwent, and continues in this direction, till, above the town of Hatherſage, it joins the chain of mountains, which lies on the weſt ſide of the county. This ridge is at leaſt twenty miles in length, and generally about five or ſix miles in breadth. But it is not interſected in its courſe by any wide and deep vallies, though it be conſtantly bounded by one on the weſtern ſide.

Betwixt this high ridge of land and the chain of hills and mountains on the weſt ſide of the county lies what is called the Peak of Derbyſhire. This likewiſe, it may be preſumed from the very name, abounds with ſeveral ridges, mountains, and high points of ground.

In the neighbourhood of Caſtleton in particular is a high mountain known by the name of Mam-Tor. It is calculated to riſe 800 feet above the valley, in which the town is ſituated, and has been regarded as one of the wonders of the Peak, but manifeſtly without any juſt cauſe for ſuch a diſtinction. For the circumſtance, which gave occaſion to it, is not by any means extraordinary. According to tradition and common report, a large quantity of earth and ſtone have been for centuries ſhivering down from its top, and ſides without any ſenſible diminution of its ſize. Whereas the fact is, that its dimenſion is very conſiderably leſſened. The moſt ſuperficial obſerver may perceive, that the part, which fronts Caſtleton, is ſo much altered by the frequent ſhivering of the earth and ſtone, that the line of the encampment anciently formed upon its ſummit is for ſome ſpace broken and entirely deſtroyed.‡

In the neighbourhood of Caſtleton there are other eminences of equal height with Mam-Tor. Win-hill and Loſe-hill in particular riſe with very high and conſpicuous points to the eaſt, and by their form may be diſtinguiſhed from all other mountains in that part of the county.

The Low Peak likewiſe abounds with hills of various height and extent. Braſſington-Moor, Alport near Wirkſworth, and Crich Cliff are more eſpecially deſerving of notice. They command very extenſive views into Leiceſterſhire, Staffordſhire, and Shropſhire. I am informed, that from Alport the Wrekin near Shrewſbury may be ſeen.

On the eaſt ſide of the county alſo there is a high ridge of conſiderable length, and extent. It begins with a gentle riſing to the ſouth of Hardwick, and having gained its

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‡ About two Years ago, as ſome gentlemen were purſuing the diverſion of courſing, they put up a hare on this mountain. Running directly towards this part of it, and finding herſelf cloſely followed by three greyhounds, ſhe had no alternative, but ſuffering immediate death by them, or throwing herſelf down the abrupt and perpendicular precipice. She made choice of the latter; and the dogs, from the impetuoſity of the purſuit, were carried down the ſame dreadful deſcent. The fate of each was ſuch, as might reaſonably be expected. They were all found dead at the bottom by the gentlemen, who were witneſſes of ſo ſingular and extraordinary an incident.

greateſt height at this place continues in a northern direction, as far as the very extremity of the county, where it enters Yorkſhire. In its courſe many large bays appear, and upon the points, which project into the neighbouring country, may be ſeen, at conſiderable diſtance from each other, Hardwick Hall, Bolſover Caſtle, and the town of Barlborough.

The northern part of Derbyſhire, which is ſo much diſtinguiſhed by the number, height, and extent of its hills and mountains, is no leſs remarkable for the great depth and width of its vallies, and the beauty and variety of its dales.

The width and depth of the vallies are generally in proportion to the heighth of the ridges and mountains by which they are bounded. Accordingly the broadeſt and deepeſt are found in the high Peak. But even here their width, I believe, never exceeds two miles, and their depth 1000 feet.

There is one circumſtance, in which theſe differ from the narrower dales, and which ſeems deſerving of notice. I do not recollect any one inſtance, in which the angles and projections on the oppoſite ſides of the latter do not correſpond to each other. Whereas in the former ſuch a correſpondence is not always to be obſerved.

The merit of the ſcenery, by which each of them is diſtinguiſhed, alſo depends upon different circumſtances. Upon looking into the broad deep vallies of the high Peak, the mind is filled with grand and ſublime ideas. But diverſified beauty is the prevailing characteriſtic of the narrow dales of the low Peak. And perhaps there is no country, which can boaſt of finer ſcenes of this latter kind than Derbyſhire.

The valley in the high Peak, which has appeared to me moſt ſtriking is that, in which the town of Caſtleton ſtands. The firſt view you get into it, when you enter it from the ſouth, is the beſt, more eſpecially at a point, where the road makes a ſudden and abrupt turning along the edge of a high and ſteep precipice down into the town of Caſtleton. The valley, which is at leaſt 800 feet deep, and in many parts nearly two miles wide, extends directly eaſtward to the diſtance of five or ſix miles. A number of leſſer dales from the north and ſouth are ſeen at various diſtances to open into it. The ſteep ſides of the valley are alſo rendered very beautiful by a ſeries of well cultivated encloſures, which riſe one above another to its very edge. The village of Hope with its ſpire church, which ſtands at the diſtance of two miles to the eaſt down the valley, has a very agreeable effect. Directing your eye along the edge of the north ſide of the valley, you ſee the country boldly ſwelling into hills, and at length terminating in two high points at a conſiderable diſtance from each other.

When you deſcend from this elevated ſituation, a freſh ſet of objects preſent themſelves no leſs ſtriking and pictureſque. At the bottom, you obſerve the town of Caſtleton. On a very high and ſteep eminence to the ſouth of it, the ruins of an ancient caſtle now and then catch your eye. And directly beyond the town the celebrated Mam-Tor raiſes his lofty head, and with an awful majeſty ſeems to overlook all this ſcene of beauty and grandeur.

This valley does not extend weſtward beyond the town of Caſtleton, but here forms a moſt noble and magnificent amphitheatre, its back riſing in many parts at leaſt 1000 feet, and the diameter of its front meaſuring nearly two miles. If purſued in a contrary direction, it will however be found to be of very great length, extending to the diſtance of 40 miles, even below the town of Derby.

In the courſe of this valley the views are extremely diverſified. In ſome places it becomes very narrow, and its ſides are ſo thickly cloathed with wood, as to render it almoſt impaſſable. It then gradually opens again, and you have a wide extended proſpect before you. Every mile, nay almoſt every ſtep preſents freſh objects and ſcenes, ſome of them the moſt grand beautiful, and romantic, which can be conceived. Whoever has followed the courſe of the river Derwent from Hatherſage by Chatſworth, Darley, Matlock, and Duffield, as far as the town of Derby, will have a clearer idea of the highly varied and charming ſcenery of this valley than any words can convey. However, it may perhaps be worth while to attempt a deſcription of that part of it, which paſſes near the village of Matlock.

Before you reach Matlock, when you approach it from the ſouth, you are preſented with a ſpecimen of the ſcenery, by which the dale is diſtinguiſhed. It is a piece of rock at the bottom of Cromford hill, which is finely varied on its ſurface, and beautifully fringed with wood.

The entrance into Matlock dale from hence, is thro' a rock, which has been blaſted for the purpoſe of opening a convenient paſſage. It was intended to have left a rude arch, when this paſſage was made. The idea was a happy one, and had it been carried into execution would have had an excellent effect. But even in its preſent ſtate the views from this place are very ſtriking; and, if the eye has not already been accuſtomed to behold ſuch ſcenes of natural beauty, the mind of the ſpectator muſt be ſtrongly impreſſed with the extraordinary one, which is here diſplayed to his ſight.

On the left hand high and prodigious ledges of bare and large rocks appear. Caſting your eye on the contrary ſide of the dale, you ſee others riſing in ſome places to the perpendicular height of two or three hundred feet, and forming a moſt magnificent rampart. But the horror, which they would otherwiſe inſpire, is greatly diminiſhed by the variety of trees and ſhrubs, with which ſeveral of them are adorned. Theſe give a ſoftneſs to the ſcene, and render it both beautiful and ſublime. Whilſt the lower part of the dale is covered with wood, and branches of trees hang in a very pleaſing manner over the edge of the river, the moſt ſtupendous rocks are ſeen above, boldly projecting forward, ſome entirely bare, and others partly covered with ſhrubs, which have no nouriſhment or ſupport, but what are found in the crevices of theſe rocks.

The beauty of this ſcene is very much heightened and improved by the conſtant windings of the dale, which extends in nearly the ſame romantic ſtile to the diſtance of two miles. But, to render the charms of this delightful place more complete, the river Derwent, which has been already obſerved to paſs thro' it, flows in ſome parts with a noiſy and rapid current, and in other with ſuch a deep and gentle ſtream, that its unruffled ſurface clearly reflects the rocks and wood near its margin. Thus do rocks, trees, ſhrubs, and water conſpire at once to fill the mind of the ſpectator with admiration and delight.

Matlock dale will be ſeen with ſtill additional advantage by croſſing the river in a boat above the old Bath. It is obſervable here, that art has contributed to improve the natural beauty of the place. On landing three walks are ſeen pointing thro' the wood in ſo many different directions. Two of them, by various and frequent windings along the ſide of the dale, at laſt bring you to its ſummit; and from the edge of a very high and ſteep precipice you have a new and different view of all the beautiful ſcenes, thro' which you have paſſed. The other path which I have mentioned, is called the Lover's Walk, and runs along the ſide of the river. It has been cut thro' the wood, and is beautifully arched by the branches of the trees, with which it is encloſed. Beſides theſe, there is another very pleaſant walk thro' a grove, which lies betwixt the old and new Baths.

But there is no one object in Matlock-dale ſo ſtriking, as a grand and ſtupendous rock, known by the name of the High Tor. It riſes almoſt perpendicularly from the river to the height of about three hundred feet, and boldly projects its broad front into the valley. The upper part is one ſolid maſs, and for ſixty yards appear to be entirely perpendicular.

Directly oppoſite to the High Tor, is a very high eminence called Maſſon Hill; and a good and eaſy aſcent has lately been formed to its ſummit. This point is called the Heights of Abraham, and furniſhes a view of almoſt the whole length of the valley. As you are now raiſed to a conſiderable height above every object, their general ſize and appearance are greatly changed. Even the High-Tor loſes all its grandeur and ſublimity. But this effect is compenſated for in ſome meaſure by the enlarged and multiplied views of the valley with which you are furniſhed. Nor is there any other ſituation, from which ſo complete an idea can be formed of all its parts at the ſame time.

In purſuing the courſe of the other rivers, which run thro' the Peak of Derbyſhire ſeveral romantic dales are to be met with. The banks of the Wye, which has its ſource near Buxton are in many places very ſtriking and beautiful.

They are particularly ſo in Monſal Dale, which is ſituated near the road leading from Bakewell to Tideſwell. I believe, it is ſeen to the greateſt advantage at that particular part, where it approaches the neareſt to the above road. That man muſt be deſtitute of taſte for the beauties of nature, who can travel this way and look into it without being filled with the higheſt degree of admiration and delight. Standing upon the edge of a high and ſteep precipice and caſting his eye down into the valley, he will behold almoſt every object, which can contribute to render a ſmall ſcene beautiful.

He will ſee the river Wye winding its current thro' a rich and verdant dale and near its bank a ſmall farm-houſe encompaſſed and partly concealed with wood: He will find the ſide of the valley, on which he ſtands, very ſteep and nearly perpendicular, in ſome parts formed of a dark ſhale, in ſome adorned with low ſhrubs, and in other covered with a ſhort green turf, with here and there a large piece of rock ſtarting from its ſurface. Throwing his eye acroſs the dale, he will perceive the oppoſite ſide riſing from the bottom with a more gentle and gradual aſcent, and ſoftened by a rich covering of wood and herbage. In ſhort, he will obſerve the whole ſcene poſſeſſed of a great diverſity of beautiful objects, of which an actual view of the place can alone give an adequate and compleat idea.

The chief impreſſion which Monſal-dale makes upon the mind, is that of a quiet and peaceful ſcene. This is the prevailing character of the place, excepting at the ſeaſon of harveſt, when it puts on a more chearful and lively appearance. It is then a little in motion, but the objects, when ſeen from the precipice, which I have already mentioned, ſeem to be of a ſmall and diminiſhed ſize. However this change in their appearance has an agreeable effect. Its novelty ſtrikes the mind with pleaſure and ſurprize.

Other parts of Monſal-dale are likewiſe worth viſiting. The views near its head are very pleaſing. At this place Litton Frith opens into it, and a high point of land, which runs in between the dales, has been greatly improved by the cultivation of aromatic plants. The whole plantation contains about twenty acres, and Mr. Baker, whoſe houſe ſtands on the ſouth ſide of it, has covered the rocks in this part with fruit trees. From this high ſituation there is a view into three beautiful dales, which extend from hence in ſo many different directions. Theſe are Monſal-dale, Litton Frith, and Miller-dale. By following the laſt up towards Buxton you are preſented with ſeveral charming and magnificent ſcenes.

The beſt are about five miles from it and at a ſmall diſtance from the village of Wormhill. The dale in this part is very deep. When you are come to the bottom, you are ſtruck with the ſight of a prodigious large rock, called Chee-Tor. It is ſaid to be 120 yards in height. In ſome parts it over-hangs conſiderably, and is beautifully fringed with wood. There is great variety in the face of this rock, nor can it be ſeen to advantage unleſs the ſpectator frequently changes the ground, on which he ſtands.

The rivulet, which flows at its foot, is likewiſe very beautiful. It is filled with large ſtones, and forms many natural caſcades.

A little way higher up the dale are alſo many delightful ſcenes. And it may be proper to add, that at the diſtance of a mile from Buxton is a deep and craggy precipice, known by the name of the Lover's Leap. The dale in this part is no more than a narrow and tremendous chaſm, and it requires ſome firmneſs of mind to be able to look down to the bottom of it, without feeling ſome degree of terror.

Dove-dale, about three miles from Aſhborne, and one from the road leading from thence to Buxton, is juſtly celebrated for its wild and fantaſtic appearance. The ſides of this valley are in almoſt every part ſteep and craggy. However, there is a tolerably good deſcent into it near a high hill, called Thorpe-cloud. When you come to the bottom, you find yourſelf encloſed in a very narrow and deep dale. Raiſing your eye up, you obſerve, on the right hand, many craggy rocks, one placed above another to a vaſt height, and on the left, a ſteep and almoſt perpendicular aſcent finely covered with wood and herbage.

This is the general appearance of the dale at the firſt entrance into it. But when you have proceeded a few hundred yards, you are ſtruck with rocks of the moſt ſingular and extraordinary ſhape.

In ſome places they are ſeen riſing up to the perpendicular height of thirty or forty yards in the form of pyramids, or ſpires of churches, and entirely detached from the ſide of the vale. In other parts, they lean over the river, and ſeem to threaten immediate deſtruction to every one, who paſſes by them. After having proceeded nearly a mile up the dale, you ſee a fine natural arch, about 40 feet high and 18 wide, in a chain of rocks which extends along the edge of a high precipice, but ſo entirely detached from it, as to have the appearance of a ſtrong maſſy wall, formed by human hands. When you have paſſed through the arch, you obſerve, at a little diſtance beyond it, two ſmall caves, one called Reynard's Hall, and the other his kitchen. This ſituation furniſhes a beautiful but confined view of the dale.

The rocks on the oppoſite ſide are finely adorned with hanging woods, and at a ſmall diſtance from hence in the midſt of this woody ſcenery ariſes a grand ſolitary pointed rock, which by way of eminence is known by the name of Dove-dale church. Its appearance is peculiarly pleaſing and ſublime, and cannot fail to ſtrike the eye of every one, who paſſes by it.

This valley is ſo very narrow at the bottom that though there is a foot path along the banks of the river it is extremely difficult and dangerous to paſs thro' on horſeback. The road lies, in many places, over ſteep and craggy rocks, and in other parts the oppoſite ſide of the dale approach ſo nearly to each other, that you are obliged to ride thro' the middle of the river. Through inadvertency and an ignorance of the place, a friend and myſelf were tempted by curioſity to proceed ſo far, as to render a retreat with our horſes wholly impracticable, and it was not without the utmoſt difficulty and danger, that we ſcrambled over the remainder of the rocks, which we had to paſs. No perſon, who has a proper regard for his own ſafety, ſhould attempt to go beyond the ſtraits of the dale on horſeback. But it would be ſtill more imprudent to try to get out by climbing up its ſides. A fatal accident, which happened ſome years ago, ſhould ſerve as a warning againſt making ſo bold and hazardous an attempt.

Formerly it was a cuſtom with a family in the neighbourhood of Aſhbourn, occaſionally in the ſummer ſeaſon, to make an excurſion to Dove-dale. They generally left their carriage at the entrance into the dale, and thoſe, who choſe to ride from thence to the cave, where a cold collation was prepared, were provided with horſes for that purpoſe. One day, as they were proceeding along the bottom of the dale, the Rev. Mr. Langton, Dean of Clogher in Ireland, propoſed on horſeback to aſcend a very ſteep precipice near Reynard's Hall, which is apparently between three and four hundred feet high: and Miſs La Roche a young lady of the party with greater ſpirit than prudence begged, that ſhe might get up behind him, and accompany him in his bold adventure. Her requeſt was immediately complied with, and the head of the horſe directed up the precipice. When they had climbed the ſteep aſcent to a conſiderable height, either thro' accident or the extreme declivity of the ſituation the feet of the horſe ſlipt, and they all tumbled down, the clergyman and horſe to the bottom of the dale, but the lady not quite ſo far, being ſtopt in her deſcent by a bramble buſh, which caught hold of her hair. When the Dean was taken up, he was found to be bruiſed in a moſt terrible and ſhocking manner. However, being ſtill alive, he was conveyed to Aſhbourn, where he languiſhed a few days and then expired. When the ſervants aſcended the precipice to diſentangle the young lady, they found her in an inſenſible ſtate. She likewiſe was immediately taken to Aſhbourn, where ſhe remained, till ſhe was ſo much recovered, as to bear a removal. The horſe was more fortunate than either of its riders. Tho' it rolled to the bottom of the precipice, the only injury which it received from the fall, was a few bruiſes on its ſides, occaſioned by the ſtirrups of the ſaddle.

Dovedale, as Mr. Gilpin|| obſerves, is a calm ſequeſtered ſcene, and yet not wholly the haunt of ſolitude and contemplation. It is too magnificent and too intereſting a piece of ſcenery to leave the mind wholly diſengaged. The ſame agreeable and ingenious writer alſo remarks, "On the whole, it is perhaps one of the moſt pleaſing pieces of ſcenery of the kind we any where meet with. It has ſomething peculiarly characteriſtic. Its detached perpendicular rocks ſtamp it with an image entirely its own, and for that reaſon it affords the greater pleaſure. For it is in ſcenery as in life. We are moſt ſtruck with the peculiarity of an original character, provided there is nothing offenſive in it."

Middleton-Dale, thro' which the road leading from Tideſwell to Cheſterfield paſſes, is a narrow, winding, and deep chaſm. In grandeur and beauty it is inferior to all thoſe valleys and dales, which I have attempted to deſcribe. Yet the rocks in it are of ſo peculiar a ſhape, that they never fail to make a ſtriking impreſſion upon the minds of thoſe, who happen to viſit the place. On the north ſide they bear a ſtrong reſemblance to the round towers and buttreſſes of a ruined caſtle. In ſome parts

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|| Northern Tour.

parts there is ſuch an appearance of mouldings, that one can ſcarcely help thinking, that the chiſſel has been employed in their formation.

The rocks, more eſpecially on the north ſide, are entirely perpendicular and riſe to the height of three or four hundred feet. But they are every where naked and unadorned, excepting at a point near the entrance into Eyam dale. Here Mr. Longſdon has raiſed a beautiful plantation, and in the midſt of it formed a grotto, which he has furniſhed with ſome of the moſt elegant foſſils collected in that part of the county.

The views in this dale are alſo a little diverſified by its frequent windings. The road is ſo very narrow, and the angles ſo acute, that, when you look forward, you are naturally led to conclude, that the high and ſharp projections will totally obſtruct your paſſage, and that you cannot proceed any further in that direction.

From the view which has been given of the general ſurface of Derbyſhire, we ſee, that it furniſhes many ſcenes of pictureſque beauty. But in vain ſhall we look for them, excepting in the valleys. Nothing can be more dreary and deſtitute of entertainment, than the country which generally borders upon them. Tho' the hand of cultivation has made conſiderable improvements in the ſouthern parts of the Peak, yet in the north large tracts of poor and waſte land are ſeen almoſt every where. In many ſituations ſcarcely a ſingle houſe or tree appears to divert the mind of the traveller, and the eye grows weary with beholding ſcenes ſo totally deſtitute of beauty and variety.

However, tho' the moors of Derbyſhire are in themſelves ſo unpleaſing and even diſguſtful to the imagination, yet they ſerve by way of contraſt to heighten the beauty of the dales and vallies, by which they are interſected. The ſudden and great change in the appearance of the country which theſe occaſion, fills the mind with ſurprize and delight. The lengthened ſhadows, which on the ſun's decline are produced by the vaſt height of the mountains, alſo afford a pleaſing contraſt to the warm and vivid rays of the ſun, glittering on the oppoſite ſide.

But, without the aid of contraſt, the vales of Derbyſhire are poſſeſſed of much pictureſque beauty, and afford the higheſt gratification to the creative powers of the painter. For they comprize within a ſmall compaſs thoſe powerful and neceſſary articles in the compoſition of fine ſcenery, wood, rock, and water, varying their effect according to the different times of the day. Accordingly they have drawn the attention of the moſt eminent painters. There is one ſcene in Matlock-dale in particular, which has excited general admiration. It is ſituated at the termination of the range of rocks, which begins near Cromford, and is known by the name of the Rock at the Boat-houſe. The beſt ſtation for viewing it is about half way betwixt the boat houſe and the turnpike gate. The painters eſteem this the moſt compleat piece of ſcenery in the whole valley. The compoſition is reckoned to be exceedingly good. It contains great variety of rock, and a good deal of wood. If it be in any reſpect defective, it is in the view to the left hand, which is rather tame. Notwithſtanding the ſcene is altogether, in the language of the painter, extremely well built, and has been copied by ſome very good artiſts.

Beſides this, there are many other fine pieces of ſcenery in theſe romantic and delightful dales, which have attracted the notice of the painter. Thoſe, who have had an opportunity of ſeeing them touched by the ſweet and magic pencil of Mr. Wright of Derby, will eaſily conceive, how deſerving they are of the attention, which has been paid them. He has not been ſatisfied with obſerving their general effect in the day, but has contemplated them by the pale and ſilver light of the moon, when every object has repoſed itſelf in peace.

CHAP. II.

The atmoſphere and climate of the county.

THE atmoſphere and climate of Derbyſhire are no leſs various, than the general ſurface of the country. In the ſouthern part of it, they greatly reſemble thoſe of neighbouring counties, which have the ſame degree of elevation. But in the high Peak and the north-eaſt extremity of the county they are materially different in ſeveral reſpects.

One circumſtance, in which the northern part of Derbyſhire differs from leſs mountainous countries, is in the quantity of rain which falls in each reſpectively. Being raiſed into the courſe of the clouds, which paſs over more level ſituations, it receives their contents in the form of rain, hail or ſnow. It is not eaſy to determine what is the exact proportion when compared with other places. For all calculations made with a weather gauge for the purpoſe of aſcertaining this point muſt be attended with ſome degree of uncertainty. Rain, during the winter ſeaſon frequently falling in the ſtate of ſnow, ſleet and hail, cannot on account of the ſtrong winds, which prevail here, be collected with ſo much accuracy, as ſeems to be requiſite. However it may be proper to mention, that at Chatſworth in 1764, 1765, 1767, 1768, about 33 inches of rain fell at a medium each year.§ But I apprehend, that in the north weſt part of the county, which is ſtill more mountainous, a much larger quantity falls in the ſame ſpace of time. For it has been obſerved, that ſhowers, which have been brought by the weſterly winds, and deſcended in great abundance in the neighbourhood of Buxton, have not reached or have been carried over the town of Bakewell and Chatſworth.

Upon compariſon we ſhall find, that ſo large a proportion of rain falls in ſcarcely any other parts of England. According to the obſervation of Mr. Barker, the mean annual quantity, which fell at Lyndon during 10 Years

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§ Dr. Percival's medical and experimental eſſays, page 60.

(1771 to 1780) was rather more than 26 inches. When taken for a larger period, for 45 Years, (36——80) it amounted to only 22, 210.† The average quantity for 3 years‡ (1778, 1779, 1780,) which was collected at the houſe of the royal ſociety, is ſtill leſs. It was very little more than 21 inches.

From a comparative view of all theſe places it therefore appears, that the quantity of rain, which falls at Chatſworth every year, exceeds, nearly one third, that, which has been collected at Lyndon and London during the ſame ſpace of time.

But the fact of which I am now ſpeaking, does not ſtand in need of any of the foregoing obſervations to procure it credit. No perſon, who is well acquainted with the high Peak of Derbyſhire, can be ignorant, that it is particularly diſtinguiſhed by its frequent rainy ſeaſons.

However, tho' ſo large a proportion of rain falls in this part of the county, it cannot be with truth inferred from hence, that the general ſtate of the atmoſphere is moiſter here than in lower ſituations. On the contrary, it has been found, that on the ſummit of high mountains a degree of dryneſs prevails unknown on the plains. M. de Luc has by repeated experiments

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† Phil. Tranſ. Vol. 74.

‡ Phil. Tran.

and obſervations eſtabliſhed this fact beyond all doubt. He has alſo diſcovered, that the air on mountains is dryer in the night, than in the day; a circumſtance, which had been obſerved alſo by M. de Sauſſure. I think it proper to take this notice of the dry ſtate of the atmoſphere in elevated ſituations during both day and night, not only as a curious fact, but likewiſe as tending to throw ſome light on the general nature of the air, which prevails in the mountainous parts of Derbyſhire.

Perhaps it may be imagined, that as a larger quantity of rain falls in the Peak of Derbyſhire than in moſt other places in England, the wet ſeaſons are here of longer continuance. Tho' ſuch a ſuppoſition may ſeem reaſonable, it is not ſtrictly agreeable to fact. This difference in the proportion of rain which falls in high and low ſituations is more owing to the great weight than the frequency or long continuance of the ſhowers. The inhabitants of low and flat countries have no conception of the violence of the ſtorms, which happen ſometimes in the Peak of Derbyſhire. The rain deſcends in ſuch torrents from the ſky, that great miſchief is done at theſe times in all the dales and vallies. I have often been ſurprized to ſee the ravages occaſioned on the ſides of the hills in different places. I was more eſpecially ſtruck in one of my excurſions with obſerving the effects of ſuch heavy ſhowers near Lea Wood at a ſmall diſtance from Crich. The extent of the ground, on which the rain fell, is about ten acres. But having a general deſcent towards one particular ſpot, the water ſwelling into a large and ſtrong torrent here broke the ſide of the hill, carried down with it a prodigious quantity of ſoil and ſtones, and even tore up a large tree by the roots. I believe, that rain falling upon ſo ſmall a ſurface ſeldom or never produces ſuch violent effects in low and level countries.

Another circumſtance obſervable in regard to the atmoſphere of the Peak of Derbyſhire, is, that it is ſubject to very ſtrong winds. Briſk currents of air are often felt on theſe high grounds, when the inhabitants of low and leſs irregular countries in the neighbourhood ſuffer great inconvenience by the extreme cloſeneſs of the weather.

It is alſo deſerving of notice, that the air in theſe elevated ſituations is remarkably clear and tranſparent. This is generally the caſe, when on the plains bordering upon them, it is duſky and loaded with vapours. This obſervation, I believe, will more eſpecially hold good in fine and ſerene ſeaſons. A contrary appearance is regarded as an indication of rainy and unſettled weather. It is generally remarked, that, when the hills and high mountains are covered with miſts in the morning the day is more frequently wet, than when the fogs appear in the valleys, or hanging upon the edge of the mountains, are diſperſed by the riſing ſun.

To form an accurate opinion of the general temperature of the air in Derbyſhire, it is evidently requiſite, that a ſeries of obſervations ſhould be made with a thermometer for a conſiderable length of time. But the information, which I am able to furniſh in this way is not ſo full and ſatisfactory, as I could wiſh. The only remark, which I have to communicate with a view of aſcertaining this point is, that during the laſt 12 years the thermometer has never been known to fall below 5 degrees, or riſe above 85. In moſt ſummers it is continually varying from 64 to 74 degrees. During the ſharp froſts of winter I believe it generally ſtands at 14. There are very few years, when it paſſes theſe two degrees of heat and cold. But it is evident, that from ſuch general obſervations reſpecting any particular climate, no juſt eſtimate can be made of its mean annual or monthly temperature. However ſome notion may be formed of each by attending to the accounts, which have been given of them in places, ſituated in nearly the ſame latitude and longitude. Now in this manner we may calculate the mean annual temperature of the air at Derby. It has already been obſerved, that the town is ſituated in lat. 52 degrees 57 or 59 minutes, and long. 5 or 6 minutes weſt; and it appears, that the mean annual temperature of Lyndon in Rutland, ſituated in latitude 52 degrees 30 minutes, and longitude 3 minutes, according to Mr. Barker, was 48 degrees, 0 3 minutes during 15 years, (1770 to 1785).* We may therefore conclude, that the mean annual temperature of Derby is not materially different. Perhaps the air here may be ſomewhat warmer on account of its greater affinity to the Atlantic ocean. This ſuppoſition is rendered probable by comparing it with the ſtandard, which Mr. Kirwan has formed for determining the temperature of different latitudes. According to his calculation the mean annual temperature for the latitude of Derby ſhould be about $50\frac{1}{4}$ degrees.

We ſhall ſee ſtill greater reaſon for approving this eſtimate, when we conſider, that this is the temperature of the ſprings in the neighbourhood

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* Mr. Kirwan's eſtimate of the temperature of different latitude,

Fig. I. *Page 51. Vol. I.*

A Section of the measures at Snitterton.

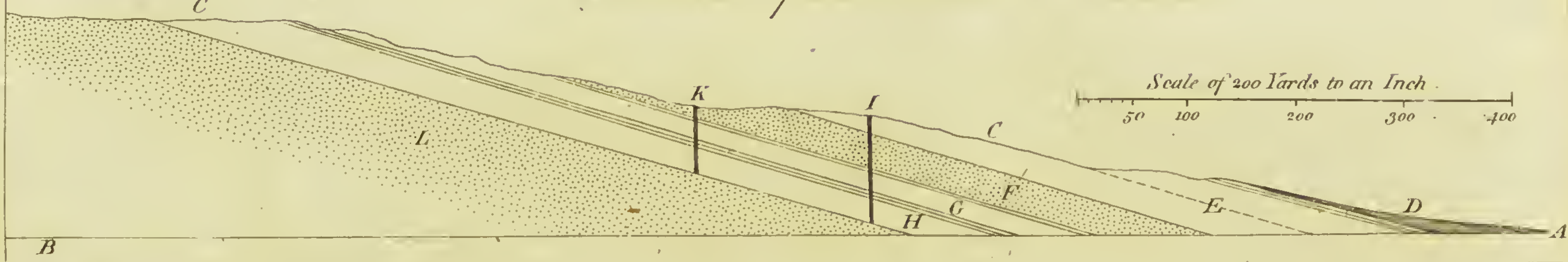
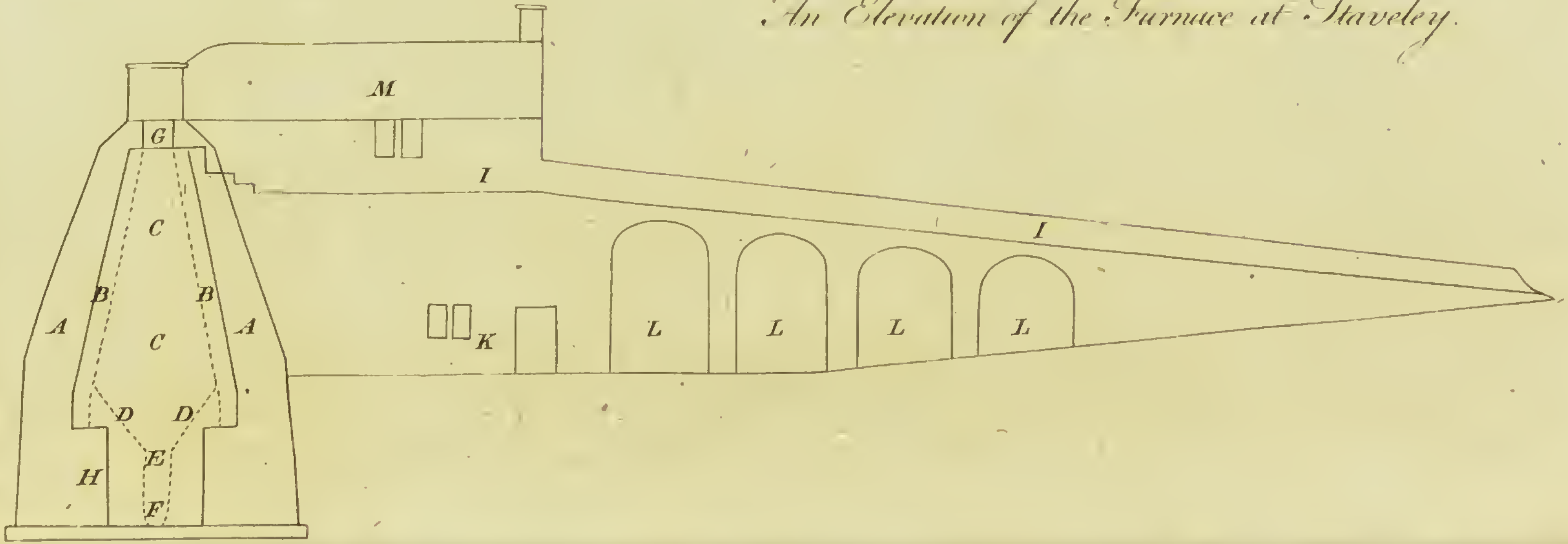


Fig. II. *Page 133. Vol. I.*

An Elevation of the Furnace at Staveley.



bourhood of the town. For this has been regarded by attentive and accurate obſervers as nearly the ſame, with the mean annual temperature of every place.

But ſuppoſing, that 50¼ degrees is the mean annual temperature of the town of Derby, it is obvious, that that of the Peak or northern extremity of the county will be conſiderably different. Its greater elevation above the level of the ſea muſt neceſſarily render it much colder. As the atmoſphere derives conſiderable heat from the earth, diſtance from it muſt be a ſource of great cold. Accordingly it is found, that the higheſt mountains under the equator are, throughout the year, covered with ſnow. It has been ſuppoſed, that the line of congelation in latitude 51 degrees is in ſummer time 5700 feet above the level of the ſea. Now as many parts of the Peak in lat. 53½ riſe to half this height, the air muſt be very cool even in the middle of ſummer. This effect of elevation would certainly be more ſenſibly felt, if the aſcent of the country was leſs gradual, or did not afterward extend conſiderably every way with nearly an horizontal ſurface. It is reaſonable to ſuppoſe, that the air is not ſo cold in the mountainous parts of Derbyſhire, as the atmoſphere at the ſame height over plains.

For by its contact with the earth, it receives ſome heat from thence.

Another cauſe of cold is the large quantity of rain, which, as it has been obſerved, falls in that part of the county, which we are examining. After wet ſeaſons the ground is always found to have loſt much of its heat. This effect is produced not only by the rain, which deſcends from the higher and colder regions of the atmoſphere, but likewiſe by the evaporation, which takes place in conſequence of it. When the vapour begins to riſe from the ground the mutual attraction of the particles of water is diminiſhed, and the heat, which now has liberty to eſcape from neighbouring bodies, riſes into the higher parts of the atmoſphere, and by this means the earth and the air near it are conſiderably cooled.

The clear and tranſparent ſtate of the air in the Peak of Derbyſhire contributes alſo to encreaſe the cold, which is obſerved to prevail here. For the rays of the ſun paſſing thro' this kind of atmoſphere do not warm it, as they are known to communicate heat only in proportion to the quantity of watery vapours which it contains. It may therefore be concluded, that the air on the mountainous parts of Derbyſhire, which is clear, tranſparent and dry, will receive but little heat from the rays of the ſun, and conſequently muſt be colder than that in lower ſituations.

The foregoing obſervations will receive much confirmation from attending to the large quantity of ſnow, hail and ſleet, which fall in that part of Derbyſhire, of which I am ſpeaking, more eſpecially at the beginning of the winter and ſpring ſeaſon. At Derby it is not unuſual to hear, that the ſnow lies there ſeveral inches, and ſometimes a foot thick, when there is not the leaſt appearance of any in the neighbourhood of the town. However, in the middle of winter and in very ſevere weather, the cold is too intenſe in the high Peak to ſuffer the ſnow to fall, and it has been obſerved to be more abundant in the ſouth of the county.

Moreover the backward ſtate of vegetation in the north part of Derbyſhire is another convincing proof of the coldneſs of its climate. Some kinds of grain will not grow, at leaſt not ripen here at all, excepting in the deepeſt vallies and thoſe, which are uſually ſown, are ſeldom ready to cut, till the near approach of winter. In the ſpring the froſt continues long in the ground, and the ſeed cannot be ſown, before the ſeaſon is far advanced. It may therefore be expected, that the harveſt will be very late. Accordingly it ſometimes happens, that in ſome ſituations the corn never ripens, and is only cut down and withered in the ſun and air.

There ſeems good ground for preſuming, that the atmoſphere in this part of the kingdom is more pure and healthful than that in lower ſituations. It has frequently been imagined, that the healthfulneſs of countries is in proportion to the degree of their elevation. The lower parts of the atmoſphere abound with fixed air, or ærial acid, which is diſcovered to be of the ſame nature with the noxious vapour found in certain caverns and ſubterraneous paſſages, and ſeen like a ſubtle ſmoak, which in ſummer riſes about a foot from the ground, but in winter not above a few inches. And from its gravity, it may be ſuppoſed, that the lower part of the atmoſphere muſt contain a larger quantity of it than the higher. Hence I imagine, ſays Profeſſour Bergman,|| the reaſon is plain, why higher ſituations are in general more healthful than lower ones. And I have no doubt, but that various diſorders, both epidemic

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|| Phyſical and chymical eſſays, Vol. 1. p. 84.

demic and endemic ariſe from the different quantities of ærial acid in the atmoſphere.

Tho' this opinion may be in ſome meaſure juſt, yet it muſt be underſtood with ſome degree of limitation. From the experiments & obſervations of M. Sauſſure it appears, that the healthfulneſs of any place is not in proportion to its elevation. He found, that the air on four mountains out of five was leſs pure, than that of the plains lying at their feet, and that only one, in which the air was more healthful than in the plains owed that advantage to a particular ſituation. He therefore preſumes, that the air at a certain height loſes ſomewhat of its purity.

In ſupport of this opinion he remarks, that inflammable air, which, according to the obſervations of S. Volta, is conſtantly produced in immenſe quantity muſt, as it is lighter than common air, riſe to the more elevated regions of the atmoſphere. On this account very high mountains, the tops of which muſt be covered with this elaſtic fluid, muſt be as unfavourable to health as very deep valleys. For, if the atmoſphere in low ſituations be rendered leſs ſalubrious by the fixed air, with which it abounds and the groſs exhalations, which its denſity enables it to ſupport, that on mountains raiſed 1000 or 1200 yards above the level of the ſea is vitiated by exhalations, which do not leſs diminiſh its wholeſomeneſs, becauſe they happen to be lighter than common air.

From theſe circumſtances it has been concluded, that there is a certain medium at which ceteris paribus the denſity of the air is beſt adapted to the purpoſes of health and life of man. This height has been fixed by M. Sauſſure at between 200 and 300 fathoms above the level of the ſea.*

Now if we apply theſe obſervations to the northern part of Derbyſhire, we ſhall be inclined to believe, that the air there is in moſt ſituations favourable to health. For it ſeems probable from the obſervations, which have been made with a view of aſcertaining its height, that it is in general raiſed between 1500 and 2500 feet above the level of the ſea; a degree of elevation, which appears to correſpond to that, which has been mentioned as beſt fitted to the purpoſes of life and health.

Moreover there are ſome circumſtances more peculiar to the Peak of Derbyſhire, from which the great purity of its air may be inferred. There are very few ſources of putrefaction, no marſhes, no ſtagnated waters, or any of thoſe cauſes of putrid air, with which low ſituations abound. Perhaps the ſtrong currents of wind which generally prevail in this mountainous country, may contribute in an equal degree to improve the ſtate of the atmoſphere. Beſides theſe favourable circumſtances another has been mentioned, the influence of which cannot be ſo eaſily determined. It has been thought, that the frequent and heavy rains which fall in theſe parts produce ſo beneficial an effect by waſhing off the impurities, which it contains.

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* Bergman's phyſical and chemical eſſays, vol 1, page 85. note (p)

How far theſe obſervations agree with fact can only be decided by thoſe, who have reſided ſome time in the north part of Derbyſhire, and cloſely attended to the health and diſeaſes of its inhabitants. It has been ſaid, that no endemic or epidemic diſorders, no agues or fevers are known to prevail here. But this aſſertion, if juſt, muſt be underſtood with ſome degree of limitation. For upon enquiry I have been frequently informed, that in the deep vallies and narrow dales agues and fevers are not uncommon, tho' ſuch as live in higher ſituations are ſeldom troubled with theſe complaints.

There is one diſeaſe, to which the inhabitants of Derbyſhire are ſo much ſubject, that it has taken its name from its great prevalence in this ſituation. It is not peculiar to the Peak but is obſerved as far ſouth as the town of Derby. It is accordingly called the Bronchocele or Derby Neck. In the year 1769 Mr. Proſſer publiſhed the following deſcription and method of curing this diſorder.

‘ The Bronchocele, or Derby Neck, is a tumor ariſing on the fore-part of the neck. It generally firſt appears ſometime betwixt the age of eight and twelve years, and continues gradually to increaſe for three, four, or five years; and often the laſt half-year of this time, it grows more than it had for a year or two before. It generally occupies the whole front of the neck, as the whole thyroid gland is here generally enlarged, but it does not riſe to near ſo high as the ears, as in the caſes Wiſeman ſpeaks of, but is rather in a pendulous form, not unlike, as Albucaſis ſays, the flap or dew-cap of a turkey cock's neck, the bottom being generally the bigger part of the tumor, and going gradually leſs upwards. It is ſoft, or rather flabby to the touch, and moveable; but when it has continued ſome years after the time of its growing, it gets more firm and confined.

‘ By the ſituation and nature of the complaint, it occaſions a difficult breathing, and very much ſo upon the patient's taking cold, or attempting to run or walk faſt. In ſome the tumor is ſo large, and ſo much affects their breathing, as to occaſion a loud wheezing. It very rarely happens to boys, indeed I have never been able to make out one inſtance of it, in a man or boy.

‘ It is very common in many counties in England, Derbyſhire eſpecially, where from its frequency it has the name of Derby Neck, and ſome other countries are almoſt free from it. I have been informed by a gentleman of the faculty, from Duffield in Derbyſhire, that there were near fifty poor girls afflicted with it in that ſmall village.

Without inquiring into the nature or cauſe of this diſeaſe, our author next proceeds to the method of cure:

‘ Having given, I think, ſuch a deſcription of the natural or curable Bronchocele, as will enable any one to know it from other complaints ſomething like it, I proceed to the cure, which when the diſeaſe exactly anſwers the deſcription I have given of it, and its continuance has not been too long, I think I may ſay will very rarely fail.

‘ I have known ſeveral completely cured at very near the age of twenty-five years, which was more than twelve years after the firſt appearance of the tumor of the neck; but yet at that age, I believe the cure is uncertain, and beyond it, though but a very few years, more doubtful.

‘ I have tried the remedy on ſeveral, at the age of ſeven or eight and twenty, but never with ſucceſs, though it may, I believe, happen ſo, if the tumor appears not very firm and confined, but rather flaccid and yielding.

‘ Many no doubt lead miſerable lives, under the almoſt intolerable torments of ſome tedious perplexing diſorders, ſuch as the nervous kind, for want of purſuing long enough, let the remedies applied be ever ſo proper and likely, for them to receive conſiderable benefit. It is ſuppoſed no one can object againſt the medicines prepared here for their cure, on account of time, or other obſervations neceſſary in their uſe, when they are informed a month or ſix weeks at fartheſt, is the longeſt time, and no confinement, or hardly any other reſtraint from the uſual way of living, is required.

‘ Let one of the following powders be taken early in the morning an hour or two before breakfaſt, and at five or ſix o'clock in the afternoon, every day for a fortnight or three weeks. The powder may be taken in a little ſugar and water, or mixed with a little ſyrup, or any thing, ſo that none is loſt:

Take Cinnabar of Antimony levigated, one
ſcruple;
Woodlice prepar'd and powder'd,
Burnt ſpunge, of each fifteen grains,
to be made into a powder. ‘ Af-

‘ After theſe powders have been taken for the time mentioned, the patient ſhould omit them for about a fortnight, and then begin with them again, and take as many more after the ſame manner, and alſo at bed time every night during the ſecond courſe of the powders, three of the following pills are to be taken:

Half an ounce of Mercurial Pill, (after the new diſpenſatory) to be divided into four equal parts;

Burnt ſpunge half dram to be mixed with it.

‘ Theſe medicines generally agree ſo well, that the patient is neither troubled with ſickneſs nor any inconvenience from their uſe, nor is any confinement neceſſary, unleſs they are taken in ſevere weather, and then it may be only to the houſe; nor need the diet be much regarded. Indeed I think it ſufficient, that the medicines be taken in a temperate ſeaſon, or rather warm weather, and the patient lives exactly in the uſual way, taking ſome care againſt catching cold. And if meat be eaten only every other day, and toaſt and river water, &c. drank inſtead of malt-liquor, it will not be the worſe; nor can the medicines ever ſucceed better than I have known them ſeveral times, when there was no difference at all made in the way of living. If the pills purge, two only ſhould be taken, and if more than an extraordinary ſtool a day is occaſioned by them, the doſe muſt be reduced to one, and continued ſo till the pills are all taken. In general it will be proper for the patient to be purged twice or thrice with manna and ſalts, or any gentle cathartic, before the powders are begun with. The medicines are here proportioned for an adult, of a good conſtitution, therefore if the patient is younger, or of a weakly habit, the doſes muſt be managed accordingly.

‘ The patient is not to expect to find much benefit in a little time: perhaps it will be as long after the medicines are all taken, as the time they are in taking, before much difference will be perceived in the tumor of the neck. It is neceſſary that the medicines be begun with at a proper time, eſpecially the ſecond courſe; a few days ſhould always be diſpenſed with upon that account.

‘ As to external application, I have never made uſe of any, as I think none can be of much ſervice. Many recommended I ſhould ſuſpect of doing harm; ſuch as fomenting the part with warm vinegar; which by its hardening the gland, though it may ſomewhat leſſen it, would render it more difficult, if not incapable of being quite reduced to its proper ſtate.†

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† A ſomewhat different method of curing the bronchocele has been practiſed with great ſucceſs at Coventry. There are two receipts by which the medicine has been prepared. They are ſaid to be equally efficacious, and the contents of each are given in the Medical Comment. Vol. 7, page 24.

Mr. Proſſer in this account of the Derby Neck has fallen into a miſtake in ſuppoſing, that boys are not ſubject to it. If the part, in which the diſorder appears, was expoſed to view, he would eaſily ſee, that they are liable to it, tho' not in an equal degree with girls. I would alſo obſerve, that the thickneſs of the neck in ſome inſtances ariſes from an enlargement of every part, with little or no appearance of a tumour in the front. In other reſpects his deſcription ſeems to be accurate and I hope, that a deſire of furniſhing a remedy for ſo common a diſorder, will be thought a ſufficient apology for the length of the quotation.

CHAP.

CHAP. III.

The ſubterraneous geography of the county.

HAVING endeavoured to give an idea of the external appearance of the country in Derbyſhire, and of the atmoſphere and climate, by which it is diſtinguiſhed, I ſhall now deſcend below its ſurface and examine its internal ſtructure. But the meaſures* being different in their nature and order in different places, I ſhall, before I enter fully upon this branch of my undertaking, mark out a few general diviſions of the county, according to the ſeveral kinds of ſtone and other ſubſtances which are obſerved to prevail in different ſituations. Now the moſt obvious and convenient diſtinction, which can be made for this purpoſe, ſeems to be that of conſidering the country under the general heads of limeſtone, coal, and gritſtone land.

I ſhall begin with deſcribing, as accurately as I am able, the extent of the various beds of limeſtone land which I have obſerved in different parts of Derbyſhire.

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* In this and the following pages the word meaſures is uſed inſtead of ſtrata, being a term better underſtood by Engliſh miners.

The moſt extenſive tract of this kind is ſituated on the north-weſt ſide of the county. Its moſt northern extremity appears at Caſtleton. The line, by which it is bounded on the weſt, runs along the weſt edge of Peak foreſt, and ſtretching forward by the eaſt ſide of Combs Moſs, continues in this direction as far as Buxton. In its courſe from this place it inclines in a ſmall degree to the north, but ſoon returning to its former direction it extends along the eaſt ſide of Ax-Edge to Dove-head. It then follows the boundary line of the county about 12 miles, and afterwards croſſing the river Dove extends a few miles into Staffordſhire. The moſt ſouthern part of Derbyſhire, in which it is to be ſeen, is about two miles north from Aſhborne. From hence the line, by which it is bounded, running in an eaſtern direction, paſſes a little way to the ſouth of Kniveton, Atlow, Hognaſton, Hopton, Caldelow, Wirkſworth as far as Matlock. At this place its courſe is again changed. It now points northward, and extends on the eaſt ſide of Snitterton, Winſter, Youlegrave, Bakewell, Stoney-Middleton, Haſlebage and Bradwell. After paſſing the road lying between Caſtleton and Hope it terminates at a ſmall diſtance above it in the valley of Edale.

Beſides this large tract of limeſtone land, there is another of ſmaller extent on the eaſt ſide of the county. It forms that high ridge, which has been mentioned as ſituated in this part. It begins at Pleaſly, and in its courſe to the north is bounded on the weſt by Glapwel, and the towns of Bolſover, Barlborough and Killimarſh. It ſpreads eaſtward into Nottinghamſhire in every part from its very firſt appearance. But its progreſs to the north is ſtill more extended. For I am credibly informed, that it reaches with very little interruption as far as Tinmouth caſtle in the county of Northumberland.

Moreover there are in ſome other parts of Derbyſhire beds of limeſtone of ſtill ſmaller extent. I believe, that they do not in any one inſtance exceed two miles in either length or breadth. They are ſituated at Aſhover, Crich, Turnditch in the pariſh of Duffield, Mugginton, Ticknall, and Oſmaſton near Aſhbourn.

The principal tract of conntry, where coal is found, begins towards the ſouth at Stanton, Dale, and Morley, and extends northwards as far as Scotland. It is called the great northern rake, and I am informed that, excepting it is interſected, near Ferrybridge in Yorkſhire, by a bed of limeſtone about three miles broad, it may be traced to the northern extremity of this kingdom. Eaſtwards it ſpreads at firſt into Nottinghamſhire, but begins to be bounded on that ſide at Pleaſly by the ridge of limeſtone, which has already been noticed as lying in this part of Derbyſhire. The line, by which it is limited after leaving Morley, runs on the weſt ſide of Horſley and Belper, and appears again at Lea, Alton in the Pariſh of Aſhover, Stubley, Dore, and Totley in the Pariſh of Dronfield, and continues in this direction till it enters Yorkſhire.

At Chinley hills near Chapel le frith coal has likewiſe been found. The ground, in which it appears, is about 3 miles in length and 2 in breadth. At Newhall in the Pariſh of Stapenhill, at Meaſham in the moſt ſouthern extremity of the county, at Church Greſly, at Calk, and in Hartington upper quarter near Buxton, there are alſo tracts of coal of nearly the ſame extent.

As to that part of Derbyſhire, where gritſtone is found, tho' it does not comprehend all the country which has not been deſcribed under the two foregoing diviſions, it is of much greater extent than either of them. The ſituation, in which it moſt uniformly prevails, is the north and north-weſt extremity of the county. It is alſo met with throughout all that tract, which lies between the two principal beds of limeſtone and coal, which have been deſcribed. Of this diſtrict of gritſtone land the eaſt moor forms the moſt conſiderable part, tho' with various breadth it extends to the ſouth almoſt as far as the town of Derby. Some beds of this kind but of ſmall extent are alſo to be ſeen at Alleſtry, Mackworth, Langley, and Stanton, and a few other places in the county.

Beſides the ſeveral diſtricts, which have been now marked out under the three diviſions of limeſtone, coal, and gritſtone land, there is a very conſiderable one, in which no beds of ſtone of any kind are to be met with near the ſurface. If a ſtraight line be drawn from Aſhbourn thro' Derby to the borders of Nottinghamſhire, it will comprehend all that part of the county, which lies to the ſouth of ſuch a line, excepting thoſe ſmall tracts of a different nature, which have already been pointed out as appearing in this ſouthern ſituation.

Having endeavoured to deſcribe in different parts of the county the different nature of the ground near the ſurface, let us proceed to examine at ſtill greater depths in the earth, the various beds, which have been now marked out.

The obſervations, which I ſhall make, will be confined almoſt entirely to the two largeſt tracts of limeſtone and coal land, which have already been mentioned. In deſcribing the internal ſtructure of the earth in theſe parts, I ſhall point out the order, and thickneſs of the various beds which have been examined, and then conſider the poſitions in which they are generally found.

In that extenſive tract of limeſtone country, which has been mentioned as lying in the north-weſt part of Derbyſhire the earth has been penetrated in ſeveral places to a conſiderable depth. Now in theſe various ſituations the order of the meaſures appears to be conſiderably different. But it is ſcarcely poſſible to convey a clear idea of them without a plate repreſenting a ſection of the ground, where they are found. Mr. Whitehurſt, in his ingenious work, has given ſeveral clear and diſtinct ones of the mountainous parts of Derbyſhire. But this publication not being in the hands of every one, I ſhall endeavour to deſcribe the arrangement and poſition of the meaſures in a ſome what different part of the county. This ſituation is Snitterton, a village lying betwixt Matlock and Winſter, and in the pariſh of Darley.

A is Snitterton. B is a level ſuppoſed to be driven into the hill in a ſouthward direction from A at Snitterton.

C C is a line repreſenting the ſurface in a ſouthward direction over the ſuppoſed level.

At D is a meaſure of ſhale, which is diſtinguiſhed by a dark ſhade. Under this are ſome fine lines, repreſenting, beds of blue marble with thin way-boards of clay or ſoft ſhale intervening betwixt them. The beds are from one to two feet thick, and the clays are in ſome places an inch thick, but in others only juſt a ſeparation of the beds.

E is a meaſure of limeſtone about 50 yards thick, ſuppoſing that a perpendicular ſhaft was ſunk through it. The upper part is a clear light coloured ſtone containing balls of chert. In ſome places appear beds of chert 3 or 4 inches thick at various diſtances, from 6 to 24 inches, from each other. The lower part of this limeſtone is of a dun colour and likewiſe contains chert. It has been proved 25 yards thick by ſinking a ſhaft at I. In this ſituation the whole meaſure from the ſurface of the ground to that, upon which it lies, is of a dun colour, and is about 24 yards thick. Very little lead ore has been got in this ſtone, tho' many trials have been made to diſcover it.

F is a meaſure of blackſtone about 28 yards thick. It has been proved in many places within the diſtance of one mile from Snitterton. I am informed, that no ore has been got in it, excepting in a ſtrong vein, called the Side, which croſſes the High-Tor at Matlock; and what is found there is of a light poor quality. Under this blackſtone is a ſolid bed of limeſtone, ſeven feet thick. Some rake-works carry ore in this meaſure.

G is a meaſure of limeſtone 16 yards thick. Under it are found three very thin beds of clay, in ſome places about an inch thick, and about 8 or 10 inches diſtant from each other.

H is another meaſure of limeſtone 30 yards thick. The rake-works in it near Snitterton bear the largeſt quantity of ore, more eſpecially in the upper part near to the three beds of clay. The pipe works are alſo the beſt in this meaſure and often go down to the ſecond blackſtone.

I and K are two ſhafts, which are ſunk to the ſecond blackſtone in a rake work ſouth from Snitterton.

L is a ſecond meaſure of blackſtone. Mr. Alſop§ (to whom I am indebted for this deſcription) ſays, that he has never ſeen it cut through near Snitterton, but upon enquiry he finds, that at a mine called Porter about two miles ſouth of this village a ſhaft was ſunk through it, and it was diſcovered to be 80 yards thick. But he apprehends, that in this ſituation the meaſures happened to dip

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§ Clerk to Peter Nightingale, of Lea, Eſq.

uncommonly. For at a place, about 2 miles ſouth-weſt from Snitterton, this meaſure has been cut through and found only 30 yards thick; and in other ſituations it appears to be not ſo much.

This meaſure of blackſtone is thrown out at the ſurface about two miles ſouth weſt from Snitterton, and about half a mile further in the ſame direction at a mine called Hang-Worm is a third meaſure of the ſame kind, which has been cut through and found about as thick as the ſecond. It appears at the ſurface at a place, called Grange Mill.

Mr. Alſop has not been able to aſcertain the thickneſs of the limeſtone, which lies betwixt the ſecond and third blackſtone, and informs me, that he has not found more than three meaſures of blackſtone in any part of the country.

In the ſection, which is here given of the meaſures near Snitterton the firſt, which would occur at the ſurface if they lay in an horizontal poſition would be that of ſhale. But in ſome ſituations there is found above this one of gritſtone alſo. This appears to be the caſe in the ſections, which Mr. Whitehurſt* has given of the meaſures at two places in the neighbourhood.

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* Appendix to his enquiry into the original ſtate and formation of the earth.

Betwixt Grange-Mill and Darley-Moor, he informs us, that the following is the general arrangement of the meaſures and the reſpective thickneſs of each. 1. Gritſtone 120 yards, 2. Shale the ſame thickneſs, 3. Limeſtone 50 yards, 4. Toadſtone or blackſtone 16 yards, 5. Limeſtone 50 yards, 6. Toadſtone 16 yards, 7. Limeſtone 60 yards, 8. Toadſtone 22 yards, 9. Limeſtone not cut through. To theſe he adds ſix other meaſures uſually called clays or way-boards, and ſays, that in general they are not more than four, five or ſix feet thick, and in ſome inſtances not more than one foot. He obſerves that the firſt meaſure of clay ſeparates No. 3 and 4, the ſecond No. 4 and 5, the third No. 5 and 6, the fourth No. 6 and 7, the fifth No. 7 and 8, the ſixth No. 8 and 9.

From theſe two ſections, and other examples which might be produced it appears that in different ſituations the arrangement is not always entirely the ſame. One reſpect in which they diſagree, is in the poſition of the clays. According to the deſcription given by Mr. Alſop, they are only found under the ſhale, and the middle of the ſecond meaſure of limeſtone. Whereas Mr. Whitehurſt informs us, that in the ſituation which he has pointed out, they are always diſcovered betwixt every meaſure of limeſtone and toadſtone. I have alſo been informed by an experienced and intelligent mineral gentleman, that upon the firſt and ſecond blackſtone there is a bed of light coloured clay from one foot ſix inches to three feet thick. By comparing together theſe ſeveral accounts it is ſufficiently manifeſt, that there is great diverſity in the ſituations of the beds of clay. But in other places beſides theſe, in which the beds of clay appear ſo variouſly arranged, one of the meaſures is entirely wanting. I believe, that the blackſtone is not found in the mines at Eyam, Foolow, or Aſhover, tho' ſhafts have been ſunk to a very great depth at all theſe places.

Another circumſtance deſerving of notice is, that theſe meaſures, when they agree in their arrangement, often differ in their degree of thickneſs, when examined in different parts of the country. This remark more eſpecially holds good when applied to the blackſtone. In ſituations not very diſtant from each other it has been found to vary not leſs than fifty yards in thickneſs. The meaſures of limeſtone and ſhale are alſo thinner in ſome ſituations than other. The former, which at Darley is 120 yards thick, is only 80 at Caſtleton.

I ſhall in this place mention a few other particulars reſpecting theſe beds, and the ſubſtances which they contain, tho' I intend in a ſubſequent chapter to enlarge more fully upon their nature and quality. The meaſures, of which I ſhall take notice, are thoſe of clay and toadſtone.

Theſe beds of clay are generally of a light colour with a blueiſh or green tinge. They always contain ſmall pieces of pyrites, which is known amongſt the miners by the name of yellow brazil. They are alſo ſaid to have a conſiderable quantity of calcareous earth mixed with them.

In regard to the blackſtone or toadſtone, it is found to vary much in its nature at different depths in the earth. The upper part of the meaſure is of a greyiſh blue colour, which become darker in proportion as you come nearer to the lower ſurface. It alſo encreaſes in hardneſs exactly in the ſame manner. In the lower part it fires at the point of the pick. This effect is occaſioned by irregular ſtreaks of a reddiſh colour. In this hard part of the ſtone are likewiſe found ſmall cavities, which contain a liquid as red as blood. Another ſubſtance, which is ſometimes met with in this meaſure is lead ore. Small pieces about the ſize of peas are interſperſed through it on Tideſwell moor. In the middle of it was alſo found at this place a vein of ore ten inches thick. Solid calcareous ſpar alſo ſometimes runs into it as thick as a man's arm. But it is frequently diſcovered in ſmall fragments or white dots of the ſize of large ſhot. Moreover ſulphur alſo has been known now and then to occur in it. A layer about an inch thick has been obſerved in the virgin mines at Haſlebage, ſo pure, that it flamed, when touch'd with a candle.

Beſides theſe there is another circumſtance deſerving of notice in reſpect to the meaſure of blackſtone in which it differs from thoſe, which are immediately above or below it. It ſeldom happens, that fiſſures or clefts are found in it, when they are met with in limeſtone at the upper and lower ſurface. If a very ſtrong vein of lead ore goes down to the blackſtone, it will ſometimes render it rather ſofter for 3, 4, or 5 feet, but is then for the moſt part cut off by it. However it is often equally good in the meaſure of limeſtone below. This has been found to be the caſe in ſeveral mines on Middleton moor, namely in Hill top mine, Slack rake, and Samuel Engeon. But in the language of the miners theſe veins are ſquinted 4 or 5 yards northwardly from their former direction, that is, they have departed ſo much from their perpendicular range. If we attend to the poſition of the foregoing meaſures, we ſhall find them governed by one uniform law.

At leaſt in every inſtance in which I have had an opportunity of making obſervations, this has appeared to be the caſe. I have always remarked, that the declination of the meaſures has been towards thoſe parts of the country, where gritſtone has appeared on the ſurface. Thro' the whole circumference of the tract of limeſtone land, of which I am now ſpeaking, they dip in this manner. But the degree of their dipping in all theſe places is various and irregular. In a mine at Corder-low near Hartington the meaſures dip about a foot in a yard, but twice as faſt at the diſtance of a quarter of a mile where the limeſtone ceaſes. At Eyam, ſituated on the north-eaſt ſide of the tract of country, which we are examining, they do not dip in an equal degree. Nor have they ſo oblique a poſition at Matlock bridge. They dip there at the rate of about ſix inches in a yard.

But tho' the poſition of the meaſures ſeems to be greatly affected by the approach of the limeſtone towards the gritſtone, yet in ſome parts of the country, it appears to depend upon other cauſes alſo. In ſome particular places it ſeems to be very much influenced by the vallies, which run thro' the country. It is frequently obſervable, that tho' on one ſide of theſe vallies the meaſures are nearly horizontal, yet on the oppoſite they have an oblique and in ſome places almoſt perpendicular poſition. This appearance has been attributed to a fracture in the earth, and in ſupport of ſuch opinion it has been aſſerted, that there is a chaſm at the bottom of the valley, which has been filled with ſtones, broken and thrown into confuſion by ſome extraordinary convulſion. However, tho' this may be the caſe in ſome inſtances, yet according to the obſervation of attentive and experienced miners the meaſures, which lie under the bed of the rivers are generally entire and undiſturbed. I have been informed, that the ſprings, which flow between them on one ſide of the river, are alſo met with in the ſame ſituation on the oppoſite; a circumſtance, which could never take place, if the meaſures were broken. For it is evident, that ſuch a fracture would interrupt the current of the water and cut off all communication of this kind between the oppoſite ſides of the dale.

It may be proper here to obſerve, that it is by means of this dipping of the meaſures, that their reſpective nature and thickneſs have been diſcovered. It would be an error to ſuppoſe that all thoſe, which have been enumerated, were ever penetrated from the ſame place at the ſurface; and did they lie horizontally we could never have obtained that knowledge of the lower ones, which may now with ſo much eaſe and certainty be acquired. It has been already remarked, that the meaſures every where dip towards the gritſtone, and that the degree of their declination in ſome places is greatly influenced by the vallies, which appear in different parts of the county. Now it ſometimes happens, that by the influence of theſe cauſes their poſition in the earth is rendered almoſt perpendicular. And it is manifeſt, wherever this is the caſe, that the lower beds will be raiſed up and appear at the ſurface. In conſequence of this effect a knowledge of the internal ſtructure of the ground has been rendered clear and unqueſtionable. The lower meaſures of limeſtone by their inclined poſition being thrown up nearly to the day, are often penetrated by the ſhafts, which are ſunk thro' them in ſearch of lead ore; and the buſineſs of mining is carried on with greater convenience and ſucceſs.

Having deſcribed the arrangement, thickneſs, quality, and poſition of the meaſures, I would in the next place obſerve, that theſe meaſures are often broken, and that in conſequence of this clefts and chaſms are met with in the earth. It has been ſaid that theſe are found in all the meaſures excepting the blackſtone, and that they are ſometimes filled by this ſubſtance. One part of this aſſertion I have never heard contradicted. I believe it is generally agreed, that the meaſure of blackſtone is found entire and unbroken. But from the enquiries and obſervations, which I have made, it appears extremely doubtful whether it is ever found in the fiſſures of the limeſtone.

Theſe clefts or chaſms are not only exceedingly various in their form and ſize, but alſo more frequent in ſome parts of the county, than in other. To give a proper idea of their nature it will be neceſſary to deſcribe ſome of the moſt remarkable, which are found in different ſituations of the high and low Peak.

When I ſay that the meaſures are broken, I wiſh it not to be underſtood, that the intervals occaſioned by ſuch a fracture, are extended in a right line, or that they are, in every part, of the ſame width. They generally run in angles or curves, and ſometimes ſwell into large caverns. Some of theſe lie near the ſurface, and therefore may be eaſily inſpected by the curious obſerver. Accordingly they have been frequently explored and deſcribed by different perſons, who have viſited this part of Derbyſhire. Some of theſe accounts have been given with a tolerable degree of accuracy, while others have been ſet off with ſuch exaggerated circumſtances of terror and aſtoniſhment as cannot fail of raiſing falſe notions of theſe ſubterraneous ſituations. Yet it muſt be acknowledged, that to every one, who has never ſeen any thing of this kind, they muſt appear very extraordinary and wonderful. I ſhall therefore give the beſt deſcription which I have been able to form from my own obſervation, and thoſe, which have been made by other perſons.

The moſt ſtriking and remarkable cavern in Derbyſhire which has yet been diſcovered in the clefts of the limeſtone, is met with at Caſtleton, and is generally known by the name of PEAK's HOLE. It is ſituated in a deep and narrow receſs of the valley in which the town ſtands. On each ſide and near the end of this receſs two large faces of rock are ſeen riſing to a vaſt height. On the ſummit to the left and cloſe to the edge of the precipice an ancient caſtle appears as it were perched aloft in the air. And at the foot of the rock on the oppoſite ſide the mouth of the cavern opens with grandeur and magnificence. It is about 14 yards high and 40 wide. The arch at the entrance is regularly formed and in a direct line extends nearly three hundred feet. This part is tolerable light and inhabited by a number of poor people employed in the manufacture of pack thread. They have built ſmall dwellings and follow their work in this ſpacious and extended vault without experiencing the burning heats of the ſummer, or the ſharp colds of the winter ſeaſon. Beyond the firſt turning a gentle declivity is perceived, and the path is rendered wet and dirty by the drops of water, which are frequently falling from the roof. At the diſtance of about 130 yards from the mouth of the cavern, all further progreſs into it was formerly obſtructed by a projection of the rock, and a deep gulph at the extremity of it. But a paſſage is now opened through the rock, and a door is hung and locked to prevent any one from going beyond this place without the aſſiſtance of a guide.

The cavern, which has been ſome time gradually contracting, appears about 20 yards from hence to be entirely cloſed in every part. However, upon a near approach to the rock a low paſſage under it, almoſt full of water, is diſcovered. This opening is juſt large enough to admit a ſmall boat, but the paſſenger in it is obliged to lie almoſt flat down, whilſt it is puſhed under the rock. Upon landing he finds himſelf in a cavern, ſtill more ſpacious than the former. It is ſaid to be 70 yards wide, and 40 high. But not a ray of light can enter it, excepting that, which proceeds from a ſingle candle, which he carries with him, and the ſaint glimmering of this tends only to render him ſenſible of the extreme darkneſs and horror of the place. However, by a proper diſpoſition of candles a tolerably complete idea of its ſhape and ſize may be formed. When ſufficiently illuminated, a path may be obſerved on the right hand, which leads up a ſteep aſcent to the top of a high rock, called the chancel. Deſcending from this elevated ſituation, and proceeding further in the cavern, you perceive that it becomes again much narrower and lower. But from this part to the end nothing occurs which is particularly deſerving of remark.

The whole length of this ſubterraneous paſſage is ſaid to be 750 yards, and attempts have been made to extend it further, from an expectation of opening a communication with another cavern. But tho' ſeveral yards of the rock have been blaſted away, all efforts for this purpoſe have hitherto proved unſucceſsful. However, about ſix years ago, at a ſmall diſtance from the end of the old paſſage, a new one was diſcovered. Its length is about 164 yards. But it is not equal in either height or width to that which has been deſcribed.

It may be proper to obſerve, that a ſtream of water runs thro' the whole length of this celebrated cavern, which muſt be croſſed ſeveral times, and in one place, on account of its depth, the aſſiſtance of the guide becomes neceſſary. After heavy rain this little rivulet is generally ſo much ſwelled as to render it impoſſible to viſit the more diſtant and interiour parts of the cavern.

POOLE's HOLE is another cavern found in the meaſure of limeſtone, and ſituated at a ſmall diſtance from Buxton. The entrance is as mean and contracted, as that of Peak's hole is lofty & magnificent. The paſſage at firſt is ſo very low and narrow, that it is impoſſible to go forward without ſtooping very conſiderably. After having proceeded between 20 and 30 yards in this poſture you enter a ſpacious and lofty cavern, the roof and ſides of which are covered with ſtalactitical encruſtations. Large piles and maſſes of the ſame ſubſtance appear likewiſe upon every part of the floor. Theſe bodies are daily encreaſing from the depoſition of calcareous earth, with which the drops of water from the roof are charged in very great abundance; and it is no ſmall amuſement as you go along to obſerve the diverſity of curious figures, which they have produced. When you reach what is called the flitch of bacon, (which is a large water-icle hanging from the roof) the cavern becomes a little contracted. But beyond this part it grows wide and lofty again, and continues ſo, till you come to the queen of Scot's pillar; a name given to a large maſſy column of ſtalactite on account of its having been viſited, according to tradition, by that unfortunate woman during her ſtay at Buxton. As the pillar cannot be paſſed without ſome difficulty and danger, few perſons venture beyond it. Nor does this ſeem deſirable. For by proceeding thus far, a pretty complete idea of the cavern may be formed. The path hitherto lies along the ſide and at ſome height from the bottom of this ſubterraneous paſſage. But, to viſit and examine the interiour extremity, it becomes neceſſary to deſcend a few yards by very ſlippery and ill formed ſteps. At firſt the path at the bottom is tolerably even and level, but at the diſtance of 20 yards from hence the paſſage riſes with a perpendicular aſcent to the height of about 80 yards. As it is difficult to climb up, it ſeldom happens that ſuch an attempt is made by thoſe, who are led by mere curioſity into the place. However it is cuſtomary for the guide to fix a candle at the extremity, which to thoſe, who ſtand below, has a ſingular and beautiful effect.

The way, by which you return, lies along the bottom of the cavern, and you are obliged to paſs under the queen of Scot's pillar. By thus changing the path, you are furniſhed with an opportunity of viewing other accumulations of water-icle, ſome of which are of a prodigious ſize and extraordinary form. You are likewiſe better enabled by this means to aſcertain the height and width of the cavern in every part. When you return to the narrow paſſage, by which you entered, two cavities are ſhewn in the rock, one of which is called Poole's chamber and the other his cloſet.

The whole length of this ſubterraneous paſſage is ſaid to be 560 yards; 460 to the queen of Scot's pillar, and 100 beyond it.

ELDEN HOLE, ſituated in Peak foreſt, is alſo a cleft in the meaſure of limeſtone. The entrance into it is not, as in the two preceding inſtances, horizontal, but perpendicular. It is a deep chaſm in the ground extending lengthways in the direction of north-weſt and ſouth-eaſt. Near the ſurface it is about 10 yards wide, and 30 long. But from hence it gradually contracts, and at the depth of 90 feet the paſſage is very much diminiſhed and confined.

In this part there is a projection of the rock, and behind it a ſmall cave, which from the quantity of light in it ſeems to have a communication with ſome place near the ſurface. I have been informed by a miner, who was let down into it, that when he had deſcended about 56 yards he came to a heap of ſtones about 14 yards high. When he alighted at the bottom, he found that he could walk off to the ſouth-weſt and north-eaſt; in the former direction he could go 30, and in the latter 40 yards. In that part of the cavern, which extends to the north-eaſt, he diſcovered a chink in the floor, out of which a ſtrong current of air proceeded. But it was filled with ſtones, which had rolled from the heap above-mentioned, and therefore could not be examined. However it appears, that about 30 years ago a Mr. Loyd deſcended into it; and as his deſcription of the firſt part of this chaſm agrees with the information I received reſpecting it, it may be preſumed that his account of what he obſerved below this ſlit in the rock is accurate. He* ſays that he deſcended thro' this narrow opening into a little cave about four yards long and two yards high, which was lined throughout with a kind of ſparkling ſtalactite of a fine deep yellow with ſome ſtalactitical drops hanging from the roof. He found a noble column above ninety feet high of the ſame kind of encruſ-

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* Phil. Tranſ. vol. 61, page 250.

cruſtation facing the firſt entrance. As he proceeded to the north he came to a large ſtone, which was covered with the ſame ſubſtance and under it he found a hole two yards deep, that was uniformly lined with it. From the edge of this hole ſprung up a rocky aſcent ſlooping like a buttreſs againſt the ſide of the cavern, and conſiſting of vaſt ſolid round maſſes of the ſame ſubſtance and colour. Up this aſcent he climbed to the height of about 60 feet and got ſome fine pieces of ſtalactite which hung from the craggy ſides of the cavern which joined the projection he had aſcended. When he got down, which was not effected without conſiderable difficulty and danger, he proceeded in the ſame direction and ſoon came to another pile of encruſtations of a different kind and colour, theſe being much rougher, and not tinged with yellow, but brown. At the top of this he found a ſmall cavern opening into the ſide of the vault which he entered. Here he ſaw vaſt drops of the ſtalactite hanging like ice icles from every part of the roof, ſome of which were four or five feet long and as thick as a man's body. The greater part of the wall of the large cavern or vault was lined with encruſtations of three kinds. The firſt was the deep yellow ſtalactite, the ſecond was a thin coating reſembling a light ſtone coloured varniſh. This covered the limeſtone, and reflected the light of the candle with great ſplendor. The third ſort was a rough effloreſcence, the ſhoot of which reſembled a kind of roſe flower.

A Gentleman, who lived upon the ſpot, told Mr. Loyd after his return from this ſubterranean expedition, that there was formerly in the floor of the great cavern ſomewhere near the large heap of ſtones the mouth of a ſecond ſhaft, which had been covered by the miners. It was ſaid to have gone down a vaſt depth further and to have had water at the bottom. He adds there is ſome reaſon to believe this water is a continuation of a ſubterranean river, which runs out of the mouth of the great cavern at Caſtleton; for a great quantity of gritſtone is obſerved to grow in the earth near Elden hole, but none near Caſtleton and yet on high floods the river at Caſtleton waſhes great quantity of that gritſtone in fragments out of the mouth of the cavern at Caſtleton. That ſuch a conjecture is not without foundation will more clearly appear, if we proceed to examine the nature of the ground which lies between theſe two places.

I have been informed by miners in Peak foreſt, who were well acquainted with the ſubterraneous geography of this part of Derbyſhire, that all the high ground lying between Perry foot and Caſtleton abounds with clefts and caverns. Now that this opinion is juſt and well founded has been ſufficiently proved by the actual diſcovery of a long ſeries of each betwixt Elden hole and the celebrated cavern near the above town. Perhaps a deſcription of their form and ſize, and an account of the order in which they ſucceed one another may be not only amuſing, but alſo throw ſome light upon the ſubject of our preſent enquiry.

The entrance into the caverns and ſubterraneous paſſages, which I ſhall attempt to deſcribe, is about four or five hundred yards weſt of Peak's hole. It is by means of a ſhaft fifty yards deep, which was ſunk about 30 years ago with a view of purſuing a vein of lead ore. At the bottom a ſmall paſſage formed by the hand, and fourteen yards long, leads to a cavern, in height about ten yards, and in diameter fourteen. When the miner firſt broke into it, it appeared beautiful beyond deſcription. Upon introducing his candle thro' the hole, which he had made, he was ſtruck with aſtoniſhment. But when he entered the cavern, it in beauty exceeded his higheſt expectations. The roof and ſides were covered with water icle, almoſt as white as ſnow. But now it is in a great meaſure ſtripped of this ornament by thoſe, who have paſſed through it. On the ſouth ſide a narrow paſſage opens fourteen yards long. It leads to another cavern, which from the entrance extends ſouth-eaſt, and is about ten yards high and forty wide. In the middle a ſhaft has been ſunk which is about eight yards deep. This brings you into a cavern about 12 yards in height. On one ſide of it is a ſmall natural paſſage about fifty yards in length, which leads to a chaſm in the rock ſixteen yards deep and three yards wide. The deſcent into it is by means of a chain. About four yards from the bottom of the chaſm is another opening in the rock about ſix yards in depth. Eight yards to the ſouth of the place, where you alight, you deſcend again about twelve yards, and at the ſame diſtance directly forwards come into a cavern nearly round. Its height is twelve yards, and diameter eight. From hence you enter a very narrow and low paſſage in which you are obliged to proceed upon your hands and knees. It was at firſt formed by blaſting a chink in the rock. It runs in a ſerpentine manner to the diſtance of two hundred and fifty yards, though in a ſtraight line it would not meaſure quite half that length. At the extremity of this paſſage you drop into a cavern, almoſt circular, ſixteen yards in height, and five in width. In this cavern two natural paſſages open in different directions. That, into which you enter, is an hundred and twenty yards long and two feet high; and at the end you diſcover another about 150 long, ſix feet high and two wide. This brings you to a deep gulph in the level, which has been driven from a place, called the Winiards.

In exploring the above ſubterraneous paſſages and caverns, a vein of lead ore was diſcovered in the ſituation, at which we are now arrived. But the purſuit of it being interrupted by the quantity of water in its neighbourhood, to remedy this inconvenience a level was driven from the foot of the hill at the Winiards, which is now carried to the diſtance of more than half a mile. When you have proceeded about two thirds of the way you come to the gulph already mentioned, which when firſt obſerved was thought to be unfathomable. The ſurface of the water in it was then about two yards below that in the level, but this being turned into it has raiſed it to the ſame height with itſelf. What is the exact depth of this gulph is not known; but, at the time I received my information, it was not filled up, tho' all the rock had been thrown in which had been blaſted for the purpoſe of extending the level beyond this ſituation.

Near this place the level is croſſed by a ſtrong current of water, which, excepting where the deſcent is conſiderable, is two feet deep, and three feet wide. It runs from weſt to eaſt, and nearly in a ſtrait line from Elden hole to the cavern at Caſtleton. The courſe of the ſtream has been followed about a quarter of a mile in each direction. The perſons, who undertook to explore it, were ſtopt in their progreſs toward Caſtleton by the great depth of the water. The obſtacle, which they met with in proceeding the contrary way, was a natural flood-gate in the rock. Could they have gone further, it is highly probable, that they would ſoon have reached Elden hole. Thoſe, who are well acquainted with the relative ſituation of both places, have computed the diſtance to be only about 400 or 500 yards. It has been ſuppoſed with great appearance of reaſon, that the current of water, which croſſes the level, is the ſame with that, which diſappears at Perry-foot, and riſes again at a ſmall diſtance below the mouth of the cavern at Caſtleton. If it runs in a direct line between theſe two places, it muſt in its courſe paſs very near to or immediately under Elden hole. From this circumſtance in conjunction with ſome other, which have been noticed, it ſeems reaſonable to conclude, that by the removal of a few obſtacles a general communication might be opened between Elden hole, the cavern at Caſtleton, the level at Winiards, and the long ſeries of caverns which have been deſcribed.

Beſides the caverns, and ſubterraneous paſſages, which have already been pointed out, there is another in Chelmorton dale, the mouth of which is open to the day, The height and width of the arch at the entrance are about eight yards each. Formerly its whole length was only about eighty yards. But a miner obſerving a vein of lead ore at the end began to work it, and broke into another cavern, conſiderably higher than the former, but very nearly of the ſame length. When firſt opened it appeared very beautiful on account of the large quantity of water-icle which hung from its roof and ſides. The miner informed me alſo, that he found upon the floor a ring, but could not deviſe, how it came thither, ſince no entrance could be diſcovered beſides that, which had been made by himſelf.

This fact, tho' it may appear extraordinary, is not ſingular. I was aſſured by another miner ſince that time, that when ſinking a ſhaft near the weſt ſide of Peak foreſt he came to a cavern, in which he found all the bones of a human body, lying at full length. He likewiſe ſaid, that upon the cloſeſt examination he could not diſcover any entrance into the cavern. Beſides this I have heard of other inſtances of human bodies being found by miners at various depths in the earth, particularly in the neighbourhood of Moneyaſh and Sheldon.

Moreover, there are on the north-weſt ſide of Peak foreſt ſeveral openings in the ground called ſwallows by the country people. They ſeem to have derived this name from the total diſappearance of ſmall ſtreams of water, which fall into them. In regard to form and ſize, they are exceedingly various. I have ſeen one, which was nearly circular. It appeared to be about 20 yards in depth and 100 in diameter.

The obſervations, which I have hitherto made reſpecting the clefts and caverns, which are found in the meaſure of limeſtone, have ſolely a reference to the high Peak. But there are ſome alſo, which are occaſionally met with in the ſouthern part of that diſtrict, which we are now examining. There is one near Braſſington in particular which appears at the ſurface of the ground. But I believe no other opens to the day in the low Peak. They however frequently occur at various depths in the bed of limeſtone in this part of the county. I have been informed, that in ſome places they are very large. One in the neighbourhood of Matlock Bath in particular, which was diſcovered by the miners in purſuing a vein of lead ore was found at the depth of about twenty-four yards. It is very wide and lofty, and nearly half a mile in length.

Dr. Short mentions ſome ſubterraneous paſſages and caverns near Eyam. But I have not had an opportunity of examining them. I ſhall therefore ſelect a few particulars from his deſcription, and endeavour to convey an idea of them in this manner.

Charleſwork, he ſays, lies at the foot of a very ſteep rock 93 yards high, and five above the level of the brook. The entrance into it is ſix yards high and eight wide. After proceeding 52 yards you come to a deep and impaſſable water. This cave, however, riſes from hence directly thro' the hill and opens into Eyam dale. There is another paſſage, which extends a mile and half towards Foolow and lies under Eyam church.

About 44 yards from the entrance into Charleſwork is another cavern diſtinguiſhed by the name of Bamforth hole. The entrance is five yards high. To the diſtance of 40 yards it is very narrow, and deſcending. But, afterwards riſing a ſteep rock you come into a large cavern, adorned with a great variety of ſtalactitious petrefactions. Beyond this, about 25 yards, you enter a magnificent room, nine yards wide and two high. Its roof, floor, and ſides ſhine with a variety of ſpars and watericles, and are adorned with ſeveral ranks of fine pyramids and other curious figures. In the middle of this cavern is a baſon three yards long and two wide. A little beyond this is a fine ſtone pillar ſupporting the roof. On the right hand of this cavern are openings into two others at the diſtance of 10 yards. The Doctor informs us, that he went 360 yards into this cavern with great amuſement, and obſerved others extending in different directions without being able to diſcover their termination.

In regard to the other tracts of limeſtone land in Derbyſhire, wherever I have had opportunity of making obſervations or enquiries I have not found them materially different in any reſpect from that, which we have examined.

At Crich, where the limeſtone appears at the ſurface about two miles in length, and one in breadth, it has, at the outward edge, a covering of ſhale, which is followed by one of gritſtone. The meaſures dip from the church in almoſt every direction, and uniformly towards the gritſtone. The degree of declination is very great. In ſome places they are nearly perpendicular.

The ridge of limeſtone, which appears at Aſhover, is attended with nearly the ſame circumſtances as that at Crich. After ſinking a ſhaft on the weſt ſide thro' a bed of ſhale 240 yards thick the meaſure of limeſtone is found to dip to the weſt, and conſequently towards the gritſtone. About half a mile from hence at a mine called Cockwell, the limeſtone with the ſame meaſure of ſhale upon it dips towards the eaſt. In the former of theſe ſituations is the famous Gregory mine, and in it the meaſures are ſaid to dip about ſix inches in a yard.

In reſpect to the ſmall tracts of limeſtone at Turnditch, Mugginton, Oſmaſton, and Ticknall, I have not had an opportunity of obtaining very ſatisfactory information. But, as far as my obſervations have gone, they ſeem to bear a great reſemblance to thoſe, which have already been noticed.

I have already mentioned a conſiderable tract of limeſtone on the eaſt ſide of the county, but the diſcoveries, which have been made with reſpect to the internal ſtructure of the ground in this ſituation, are ſo few, as to be ſcarcely deſerving of notice. No good veins of lead ore having yet been found here, the earth has never been penetrated to any great depth. Nor is it interſected by deep vallies in the ſame manner with the limeſtone in the Peak, which has been examined. Conſequently there have not been furniſhed any opportunities or means of acquiring a knowledge of the arrangement, quality, thickneſs, and poſition of the meaſures in this part of Derbyſhire.

Having attempted to give an idea of the internal ſtructure of the earth near its ſurface, in that extenſive tract of limeſtone, which is ſituated on the north-weſt ſide of Derbyſhire, I ſhall now make ſome obſervations on the diſtrict of clay-ſtone land yielding coal, which lies near the north-eaſt part of the county.

The meaſures are here found to be exceedingly various in their quality, thickneſs, and order. This will be rendered manifeſt by comparing them with each other as they are met with in different ſituations. Let us begin with giving a catalogue of them in the moſt ſouthern part of the country, which we are examining.

Meaſures penetrated by ſinking a ſhaft at Weſt-Hallam.

	feet	inches
Soil and clay - - -	7	6
Bind or hard clay - - -	48	0

	feet	inches
Smut or ſoft coal	1	6
Clunch harder than bind, and full of ironſtone balls with roots running thro' it	4	0
Bind	3	0
Clay-ſtone	1	0
Bind	18	0
Black ſhale	2	0
Bind	12	0
Burning ſhale	3	0
Hard grey clay with a bed of cank, a ſubſtance as hard as flint	54	0
Soft coal	4	0
Black dun, an earthy coal	0	6
Soft coal	4	6
Clunch and bind	21	0
Coal	1	0
Broad bind	26	0
Hard coal	6	0
	222	3
Yards 74	0	3

Meaſures, which occurred in ſinking a ſhaft at Ilkeſton:

	yards	feet	inches
Soil and yellow clay	2	0	6

Black

	yards	feet	inches
Black ſhale - -	1	1	0
Ironſtone - - -	0	1	6
Coal - - -	0	1	3
Clunch - - -	2	0	6
Grey ſtone - -	3	0	0
Blue ſtone - - -	2	1	0
Black ſhale - -	0	1	6
Brown ironſtone - -	0	1	0
Black ſhale - - -	2	0	0
Light blue bind - -	2	0	6
Burning ſhale - -	0	2	6
Light blue clunch -	1	1	0
Light blue ſtone - -	3	0	0
Blue bind - -	0	2	3
Coal - -	0	1	6
Black clunch - -	0	0	4
Black jay, a ſort of cannel coal	0	0	9
Lightiſh blue clunch -	0	2	5
Broad bind - - -	2	1	6
Light coloured ſtone -	1	1	0
Greyiſh blue cank -	2	0	6
Very light coloured ſtone -	4	2	0
Strong broad bind -	1	1	0
Grey ſtone - - -	2	1	0
Blue bind - -	1	1	0
Soft coal - - -	0	2	6
Black bind - -	2	0	6
Soft coal - - -	1	1	0

	yards	feet	inches
Black clunch	1	0	0
Light coloured clunch	1	0	0
Broad Bind	3	2	6
Coal	0	0	0
Black clunch	1	0	0
Clunch and bind	8	1	6
Hard coal	2	0	3
Clunch	1	0	9
	63	1	4

Meaſures, which occurred in ſinking an engine pit on Alfreton Common:

	feet	inches
Soil and clay	7	0
Skerry, or ſhattery ſtone	9	0
Bind	13	4
Blueiſh ſtone	6	0
Bind	33	8
Blackiſh ſtone	5	0
Bind	2	0
Blue ſtone	2	0
Bind	10	0
Coal	1	6
Stone bind	37	0
Tender bind	7	0
Soft Coal	3	0

		feet	inches
Bind		3	0
Tender ſtone		20	0
Bind		16	0
Hard coal		7	4
Yards	61	1	4

Meaſures bored through at a place called the Stone Pits belonging to John Coap at Pinxton:

	feet	inches
Earth and clay	7	6
Stone	16	0
Blue bind, very kind	10	0
Dark coloured bind	8	6
Strong blue bind	12	4
Grey ſtone	3	10
Light coloured bind with ironſtone ſhreds	19	2
Dark coloured ſtone	2	1
Blue bind, very kind	8	0
Strong black ſtone	1	10
Hunch	1	8
Stone	1	6
Smut	0	3
Dark coloured bind with ſtrong ironſtone	1	3

	feet	inches
Dark coloured ſhale ſomewhat reſembling ſmut	2	0
Hard ſtone	6	5
	104	2

Meaſures ſunk thro' near Pinxton Church:

	feet	inches
Soil and clay	6	5
Black ſhale with coal ſhreds in it	3	4
Blue bind	1	6
Stone	2	0
Short crumbling ſtone	2	0
Blue bind	7	0
Black ſtone ſhale intermixed with coal	2	2
Clunch containing ironſtone balls	3	6
Very kind bind containing ſtripes of coal	5	0
Grey ſhaley ſtone with ſhreds of black ſtriped ſtone	2	0
Black ſtriped ſtone	2	4
Yellow gritty ſtone	4	0
Gritſtone of a binding nature	9	9
Cank	3	3
Grey ſtone with many coal ſtripes good gets	9	1
Strong bind	5	6

Smut

Smut	3	0
Hard coal	5	10
	77	8

Meaſures, which occur in the coal pits at Stubley in the pariſh of Dronfield:

	yards	feet	inches
Gritſtone	30	0	0
Blue bind	11	0	0
Black ſhale	7	0	0
Coal	0	3	0
Dirt	0	1	6
Coal	0	2	0
	50	0	6

Another bed of coal, which is worked, lies under all theſe meaſures. But I have not been informed, what is exactly its thickneſs. It is alſo deſerving of notice, that the firſt meaſure is not to be met with in any of the ſituations which have been pointed out in the foregoing examples.

From this view of the meaſures in different ſituations it appears, that tho' they bear a general reſemblance to each other in their quality, their thickneſs and arrangement are very much diverſified and uncertain. Even in places bordering upon each other no correſpondence is to be obſerved in the order, in which they are found. Nor would it be eaſy to diſpoſe of ſuch various ſubſtances in a more diverſified manner.

The poſition of theſe meaſures is ſeldom, if ever, found to be horizontal. They dip in almoſt every direction. I have taken ſome pains to aſcertain in what manner they are affected by the tract of limeſtone and gritſtone, with which this part of the county is bounded. But I cannot diſcover, that when they approach either, they are governed in the method of dipping by any uniform and certain law. On the weſtern ſide, where the gritſtone appears, they generally decline from it. This is particularly the caſe at Horſley caſtle, the Chevin, and Wingerworth. Yet in the intervals betwixt theſe places there are ſome ſituations, in which the meaſures of clayſtone ſeem to dip under the gritſtone. For at Alderwaſhley, Lea, Alton near Aſhover, and in the neighbourhood of Stubley and Hatherſage coal has been found under the laſt kind of ſtone.

If we paſs acroſs the diſtrict, which we are examining, to the eaſt ſide of it, we ſhall find the dip to be more regular and uniform. I believe, that it is generally, if not always, to the eaſt. It has this poſition when it joins both the gritſtone and limeſtone. At leaſt I am not acquainted with any one example to contradict this obſervation.

Having examined how the meaſures dip near the boundaries of the clayſtone land, of which I am ſpeaking, let us next ſee what is the poſition in other ſituations. Now this is determined by what are called faults amongſt the miners. But to form a clear idea of this matter it will be neceſſary to explain the meaning of this term. With this view it ſhould be obſerved, that the meaſures are in ſome places entirely broken, and that the opening occaſioned by ſuch a fracture, is filled up with a compound of clay, ſpar, lead ore, coal, and almoſt every other mineral ſubſtance. And wherever this happens there is ſaid to be a fault. The depth of theſe faults tho' certainly great, is not exactly known. But there is no doubt, but that their breadth is various. Tho' it ſeldom exceeds a few yards, it has been in ſome ſituations found to amount to fifty. In regard to their length, I believe, it has not been fully and clearly aſcertained. They have been in ſome inſtances traced to the diſtance of two or three miles from the place, where they have been diſcovered. They do not extend in a right line, but in a manner equally winding and irregular with the vallies in which they are found.

The meaſures on the oppoſite ſide of theſe faults are never met with in the ſame poſition.

They are always obſerved to be raiſed much higher, or ſunk down conſiderably lower in the earth. If they hang at the head, or lean forward, they are certainly gone downwards. But if they decline from the faults, the lower meaſures are raiſed higher than they appear on the oppoſite ſide.

As theſe faults are diſcovered every where, and extend in almoſt every direction, it is evident, that the meaſures muſt dip variouſly in different ſituations. Perhaps their declination may in ſome places be owing to other cauſes. But it is certain, that wherever faults occur, the poſition of the meaſures is altered.

It has been already hinted, that the faults often are met with in vallies. However we cannot infer from hence, that they are always to be found in ſuch ſituations. For the meaſures are generally entire and undiſturbed in the wide vallies, whilſt in the narrow ones they are in great diſorder and confuſion.

At Cheſterfield and Heanor the meaſures have a peculiar poſition. They dip for a conſiderable ſpace towards one common center, and by this means form a ſort of baſon or deep circular figure.

It has been obſerved by miners, that the meaſures are thinner at the baſſit edge, than in any other part. But at a certain depth they acquire a regular thickneſs, which they preſerve, till you come near the faults, where they gradually become thinner again. From theſe circumſtances it ſeems probable, that the meaſures have ſome time had an horizontal poſition, and by ſome means been broken ſo as to lie in an oblique direction.

In the ſouthern part of the county we have already obſerved, there are two ſmall tracts of clay ſtone land, which yield coal, one of them ſituated at Newhall, and the other at Meaſham.

At Newhall the following meaſures are found in a ſhaft known by the name of the old coal pits.

	yards	feet
Blue earth - -	4	0
Black earth - -	16	0
Tool coal - -	1	0
Blue bind - -	1	0
Main hard coal - -	2	0
Blue bind - -	1	0
Deep coal rather ſoft -	2	1

The meaſures dip here from the north, eaſt, and weſt, towards one common point. But the main declination is to the ſouth. The coal baſſits to the weſt at Newhall park, to the north about 500 yards from Briſlincote-hall, and to the eaſt near Swadlincote, at a ſmall diſtance from the turnpike road lying betwixt Burton and Aſhby.

The extent of the ground is about half a mile from the moſt northern baſſit of the coal to the moſt ſouthern dip; and the weſtern and eaſtern baſſit are about a mile from each other.

At Meaſham the meaſures dip from the ſouth, eaſt, and weſt toward one common point. The baſſit edge of the coal appears to the weſt juſt beyond the village of Oakerthorpe, to the eaſt near to Wilſley, and to the ſouth about half a mile ſhort of Swebſtone.

The meaſures at Chinley hills near Chapel-le-frith, where coal is alſo found, dip on oppoſite ſides of the hill in different directions. In that part, which contains coal, they decline to the weſt, and on the contrary ſide they alſo follow the deſcent of the hill.

In regard to the nature and ſtate of the meaſures in that part of the county bearing coal, which lies ſouth-weſt of Buxton, I have had no opportunities of gaining certain information. But I apprehend that they dip to the weſt, and believe the coal is found at no great depth in the earth.

In that part of Derbyſhire, which has been diſtinguiſhed by the name of gritſtone land, the nature of the meaſures is but little known. Throughout the pariſhes of Chapel-le-frith, Gloſſop and Hatherſage, and the whole extent of the eaſt moor the gritſtone appears in two different ſtates. It is ſeen every where ſcattered in looſe and detached pieces upon the ſurface of the ground. In ſome places it is alſo found in one vaſt ſolid maſs, and ſeems to form entire ridges and large eminences.

At Coxbench, Breadſall, Mackworth, Alleſtrey, Duffield, Stanton, and Melbourn, where the gritſtone does not appear much at the ſurface, it extends very deep in the earth. In ſome of theſe places it is known to lie in an entire bed fifteen or twenty yards thick.

It has been already obſerved, that there is a large tract of land in Derbyſhire, where neither lime, coal, or gritſtone is found. In this part of the county the ground conſiſts of meaſures of red clay of different ſhades, and degrees of hardneſs. Others of a greeniſh colour may likewiſe be ſometimes obſerved interpoſed betwixt them. Theſe beds differ in quality as well as colour and hardneſs. Some of them are calcareous, and are therefore called marl.

In ſome ſituations thick beds of gravel alſo are met with. But the ſubſtance moſt deſerving of notice in the tract of country, which we are now examining, is Gypſum, or Plaſterſtone. It is found in a nearly ſtrait line acroſs the midland part of the kingdom, and appears in ſeveral places in Derbyſhire. It has been got in the largeſt quantity at Chellaſton, Aſton, and Elvaſton, three pariſhes bordering upon each other, and about five miles ſouth-eaſt of Derby.

The depth at which this ſubſtance lies in the ground, is generally about eight yards from the ſurface. It is not found in regular layers, but in large lumps or blocks indented together, which may be eaſily ſeparated from each other.

The thickneſs of the beds of plaſter-ſtone is from two to four yards; and at the diſtance of a foot above it is regularly ſpread a thin layer of roche plaſter.

CHAP. IV.

Mines and ores with the method of working each.

HAVING endeavoured to give ſome idea of the general ſurface of Derbyſhire; and of the various meaſures of which the ground is found to conſiſt in different ſituations, I ſhall now examine and deſcribe the chief mineral ſubſtances, which accompany theſe meaſures throughout the county.

Now productions of this kind are not only met with in great variety, and abundance, but are in their nature highly valuable. They conſtitute a conſiderable part of the natural riches of Derbyſhire. I mean therefore to pay a very minute attention to the ſtate in which they are uſually found, and the various methods, which are purſued to prepare them for the different purpoſes to which they are commonly applied. I ſhall begin with making ſome obſervations, upon the antient and preſent ſtate of the lead mines in the county.

How long the ore of lead has been diſcovered and attended to in this county it is not poſſible with preciſion to determine. But it is certain, that the working of its mines is a buſineſs of very remote antiquity. There is not the leaſt room to doubt, but that they engaged the attention of the Romans at the time, when they were in poſſeſſion of this country. Cambden thinks, that Derbyſhire was alluded to by Pliny, when he ſays, " In Britain lead is found near the ſurface of the earth in ſuch abundance, that a law is made to limit the quantity, which ſhall be gotten." It muſt be acknowledged, that this is only conjecture. But the proof of the point under conſideration does not depend upon ſuch uncertain evidence. In the year 1777 a pig of lead with the following inſcription upon it was found on Cromford moor, and is now in the poſſeſſion of Peter Nightingale, of Lea, Eſq. IMP. CAES. HADRIANI. AUG. MEI. LVI.

It has been thus interpreted by the Rev. Mr. Pegge.* The ſixth legion inſcribes this in memory of the Emperor Hadrian. He ſuppoſes the pig to have been caſt about the year of our Lord 130.

Since the diſcovery of this block of lead two others have been found in this part of the county. The firſt in the year 1783 was met with in Matlock bank. But it is very difficult to aſcertain the meaning of the inſcription. The words upon it are not only very much abbreviated, but likewiſe conſiſt of compounded letters, ſo that great room is given to the indulgence of conjecture. The Rev. Mr. Pegge, who is diſtinguiſhed by his extenſive and accurate knowledge of antiquities, thinks, that the inſcription will admit of this conſtruction, Lucius Aruconius Verecundus Mercator Lundinenſis. The property of Lucius Aruconius Verecundus lead merchant of London. The letters are in very ſharp relief, and as perfect, as if they were newly formed. The length of the block on the upper ſurface is 19 inches, the breadth 3½. The length on the lower is 22 inches and the breadth 4¼, and the weight is 84lb.

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* Archaelog. Vol. iv.

Another block of lead has been found at Matlock at a ſtill later time. It has inſcribed upon it the following letters: TI. CL. TR. LVT. BR. EXARG. which according to the learned and ingenious conjecture of the Rev. Mr. Gifford, ſtand for theſe words. Tiberii, Claudiani, Triumviri Lutudari Britannorum Ex Argentaria. The weight of this pig is 12 ſtones, and 5 pounds.

If we admit of the conſtructions, which have been put upon theſe two blocks of lead, we muſt allow, that they were very probably caſt at the time, when the Romans were in poſſeſſion of this part of Britain. But without having recourſe to them, the great antiquity of the lead mines in Derbyſhire has been ſufficiently proved by the pig, which was found on Cromford moor. This affords undoubted evidence, that they were worked by the Romans. And if this point wanted confirmation, the inſcriptions upon the other blocks of lead might not improperly be employed for ſuch a purpoſe.

That the lead mines of Derbyſhire have been worked ever ſince the æra, of which I am ſpeaking, is a matter, which may be proved with nearly the ſame clearneſs, and ſatisfaction. The Saxons and Danes, who immediately ſucceeded the Romans in the conqueſt and dominion of Britain, appear not to have been ignorant of the value of the metal, which we are conſidering. At Caſtleton there is a mine, which has received its name from one of their deities. It is called Odin, and, we may preſume, was opened, before the chriſtian religion was introduced, at leaſt before it was generally profeſſed in this kingdom.

From a grant, which an abbeſs of Repton made of Wirkſworth, when it belonged to the religious houſe at that place, it is evident, that there were in the year 835 lead mines in the Wapentake. For Kenewara, who was then governeſs, granted to Humbert the alderman her eſtate at Wirceſworth on condition, that he annually gave as rent to archbiſhop Ceolnoth lead to the value of 300 ſhillings for the uſe of Chriſt church in Canterbury. Mr. Pegge thinks, that there were lead mines at Wirkſworth even before 714. In ſupport of this opinion it may be obſerved, that Eadburga, Abbeſs of Repton, ſent St. Guthlac, patron ſaint of Croyland abbey, who died in that year, a leaden coffin, and a winding ſheet or ſhroud, in which he was buried.†

It appears from a ſurvey of the caſtle of the Peak, which was made in the time of Queen Elizabeth, and is kept in the Duchy court of Lancaſter, that it was then covered with lead. And it ſeems not unreaſonable to ſuppoſe, that the metal uſed in this inſtance was procured from the neighbouring country. Now if this was really the caſe, the mines muſt have been attended to ſoon after the period, of which I am ſpeaking. For I ſhall have occaſion to ſhew, in a ſubſequent part of this work, that

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† Dugdale Mon. Angl. vol. 1. p. 88.

the caſtle was built ſome time before or at leaſt as early as the reign of William the conqueror.

At the time of the Norman ſurvey the buſineſs of the lead mines undoubtedly was carried on to a conſiderable extent. In domeſday book mention is made of three at Wirkſworth, and one at each of the following places, Crich, Aſhford, Bakewell and Metesford, a manor which is deſcribed as ſituated in the neighbourhood of Matlock. And it is particularly obſerved, that the three manors of Bakewell, Aſhford and Hope paid in the time of Edward the confeſſor 30l. and five cart loads of 50 ſheets, but that in the time of the conqueror it paid only 12l. 6s.

If we come down to a ſtill later period, we ſhall find, that the inhabitants of Derbyſhire have never loſt ſight of the object, to which we are now attending. In the 16th year of Edward 1ſt two perſons were appointed by the crown before the ſheriff of the county to make enquiry at Aſhbourn into the rights and cuſtoms of the miners.‡

In the twenty-ſecond year of the ſame reign a ſilver mine was diſcovered at Comb Martin in Devonſhire, and 337 Derbyſhire miners were taken from the Peak to work there.*

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‡ Fodinæ regales by Sir John Pettus, p. ——

* This obſervation, I believe, is taken from Dugdale's Baron. p. 295. But not having that work now in my hands, I will not anſwer for the accuracy of this reference.

The brazen diſh, by which the meaſures of the ore in the low peak are regulated, appears from the following inſcription upon it to have been caſt in the reign of Henry 8.

“ This diſhe was made the iiij day of Octobr the iiij yere of the Reigne of Kyng Henry the viij before George Erle of Shroweſbury Steward of the Kyng moſt Honourable houſehold and allſo Steward of all the honour of Tutbery by the aſſent and conſent as wele of all the Mynours as of all the Brenners within and adioynyng the Lordſhyp of Wyrkyſworth Percell of the ſaid honour This Diſhe to Remayne In the Moote hall at Wyrkyſworth hanging by a Cheyne ſo as the Mchanntes or Mynours may have reſorte to the ſame att all tymes to make the trw Meſure at the ſame.”

The books of the barmaſters which were formerly kept at the caſtle in the Peak, and are now depoſited at Chatſworth, bear teſtimony to what has been done in modern times.

To what extent preciſely the buſineſs of the lead mines has been carried on in this county at the different periods, which have now been mentioned, cannot with certainty be determined. But it is an undoubted fact, that the produce of them during the laſt century has been very conſiderable. At preſent lead ore is found in various parts of the county. It is met with throughout the Wapentake of Wirkſworth, and in the high Peak as far northward as Caſtleton. Indeed it has been diſcovered in different quantity in all that extenſive tract of limeſtone land, which has been deſcribed as ſituated on the north weſt ſide of Derbyſhire. Lead ore has been found alſo in the large bed of limeſtone on the eaſtern borders of the county, particularly in the neighbourhood of Bolſover, Barlborough, and Whitwell. It has likewiſe been gotten at Aſhover, Crich, Turnditch, Mugginton, and Calke. In ſhort, I have not heard of any bed of limeſtone in Derbyſhire, in which it has not been in ſome meaſure diſcovered. However, tho' lead ore appears thro' ſo large an extent of country, it is met with in the greateſt abundance about ten miles to the north and ſouth of the river Wye. The obſervations, which I ſhall now make, therefore will chiefly relate to this part of the county.

Veins of lead ore on account of their various poſitions in the earth are diſtinguiſhed from each other by three different names. They are divided into pipe, rake, and flat works.

The vein called a pipe work lies between two rocks, or meaſures of limeſtone, which regularly extend above and below. It conſiſts of ſeveral lines or branches, which run nearly parallel to each other, and tho' ſome of them may in particular ſituations depart from ſuch a direction, yet they ſeldom fail afterwards to return to it. Theſe branches have a general communication or connection with each other by means of fine ſlender threads or leadings, as they are called by the miners. The rock, which runs along each ſide of the vein and ſeems to bound it in thoſe parts, is ſometimes pierced through by ſuch tranſverſe threads. When this is the caſe it is generally thought right to follow them, as it frequently happens, that beyond this apparent boundary a freſh range is diſcovered. Should no ore be found, after paſſing the rock, the entire breadth of the work will be aſcertained. But its length is more variable and indeterminate. It depends very much upon the dipping of the meaſures, betwixt which it is extended. If this be great, it begins to decline, or cannot be purſued any further on account of the quantity of water, which is found at ſo great a depth in the earth.

The vein, called a rake, is different in almoſt every reſpect from the Pipe. It is found in the chaſms and clefts of the limeſtone. Conſequently inſtead of extending uniformly between the ſame meaſures, it breaks through them, and ſinks into the earth. It ſometimes penetrates an hundred and fifty or two hundred yards. It generally runs in a ſlanting direction, and has been followed to the diſtance of four miles from the place where it was firſt diſcovered. I believe that this is the caſe with the ſide rake at Matlock.

The Flat work bears a great reſemblance to the Pipe. There are however a few particular circumſtances, in which they diſagree. The Pipe has a perpendicular leader or ſtem, which is accompanied with many branches but the flat has none. The latter ſpreads wider, but never continues long; it ſeldom extends more than an hundred yards. It is alſo found near the ſurface and in the ſolid rock, and is very weak and poor. It is ſeldom thicker than a man's finger.

Excepting the flat works theſe veins are ſcarcely ever diſcovered in the ſolid bed of limeſtone. They are generally encloſed in a yellow, red or black ſoil and are ſtrongly combined with cauk, and ſpar, or ſome other mineral ſubſtance.

The direction, in which veins of lead ore are diſcovered, cannot with ſtrict propriety be conſidered as regular and uniform. As the pipes never penetrate through the meaſures, between which they extend, they are found to dip with the country where they appear. The range of the rake is ſtill more various and uncertain. In the high Peak they generally run eaſt and weſt, and in the Wapentake of Wirkſworth north and ſouth. I have, however, ſeen ſometimes two veins cut each other nearly at right angles.

Another fact of a ſimilar nature with that, which I have now mentioned, is, that the rake and pipe veins ſometimes unite, and run together a ſhort way in the ſame direction. In this caſe they grow ſtronger and richer, tho' they ſometimes become totally extinct.

It is not eaſy, if poſſible, to determine, which kind of vein is the moſt prevalent in Derbyſhire. Thoſe miners, whom I have conſulted, are divided in their opinion reſpecting this point.

There is no leſs difficulty in deciding, which ſort of vein is the moſt productive of ore. Both pipe and rake works in different places have yielded it in great abundance. But I believe that the former are more generally good.

Various are the ways, in which veins of lead ore are diſcovered. Sometimes they are found by an attention to the nature of the ground, and ſometimes by mere accident. As all veins are accompanied with certain ſubſtances, the experienced miner is greatly aſſiſted in his reſearches by a knowledge of this fact. Whenever he obſerves ſuch indications of ore, he either throws up a trench or digs a round hole in the earth. And, as veins generally ſend forth ſmall branches out of the rock into the ſoil towards the ſurface of the ground, he frequently by this means meets with the object of his ſearch.

But important diſcoveries are often made without trouble or deſign. The furrow of a plough, the treading of a horſe, the working of a mole, and various other incidents will ſometimes expoſe to ſight the branch of a vein, and lead to the diſcloſure of ſuch treaſure, as the greateſt ſkill and induſtry could never have made.

It has been already obſerved, that all veins have ſome branch, which riſes nearly to the ſurface; and it is found, that the richneſs or poverty of veins greatly depends upon the ſtrength and number of the branches, by which they are attended. Whenever theſe weaken and diminiſh, the vein generally begins to decline. I have heard of only one exception to this rule. It happened in a valuable mine at Wirkſworth. In this inſtance ſeveral branches pointed towards each other, and it was expected, that a large vein would have been formed by their union. But it was ſoon found that ſuch hopes were deceitful and groundleſs.

Another circumſtance, which likewiſe indicates the declenſion of a vein, is, when it runs in ſuch a direction, as to receive upon it a greater number of meaſures at the ſurface. This is the caſe at Ratchwood, Orchard, and Raventor mines in the liberty of Wirkſworth, at a mine near Crich, and at Dimple mine in the pariſh of Matlock. In all theſe places the veins become poorer, as they receive greater covering.

I have been informed, that many miſtakes and inconveniences have ariſen from an inattention to this circumſtance. However it ſhould be remarked on the other hand, that this obſervation does not hold good in all ſituations. In ſupport of this aſſertion it is found that the vein in the famous Gregory mine at Aſhover has grown richer and more valuable in proportion to its depth in the earth.

The method of working lead mines is in general ſo well known, that it is ſcarcely neceſſary to make any obſervations upon this buſineſs as practiſed in Derbyſhire. There are however two impediments which occur in the proſecution of it, of which it may be proper to take ſome notice. Theſe are water and bad air.

To relieve the mines from water many expedients are daily employed. The moſt common and effectual one, is driving a ſough or level from the bottom of ſome neighbouring valley as far as the works. But it ſometimes happens, that the vein lies ſo deep in the earth, that the water cannot be drawn off in this way, It then becomes neceſſary to have recourſe to pumps, which are worked ſometimes by a wheel turned by a neighbouring ſtream of water, and ſometimes by a fire engine placed at the mouth or in the inſide of the ſhaft.

The uſual way of relieving mines from bad air is by the introduction of a pipe or tube down the ſhaft to the place where the work is carried on. As the pipe turns near the bottom of the ſhaft, and is extended along the roof of the gallery, a circulation of the air immediately takes place, and the inconvenience ariſing from the want of this effect is entirely removed,

To give a regular account of the ſeveral branches of the buſineſs of the lead mines, it will be requiſite in the next place to take notice of ſome of the cuſtoms and regulations, by which it is in its different ſtages governed and conducted. But before I do this, I ſhall offer a few thoughts concerning their origin and eſtabliſhment.

We have already ſeen, that the lead mines of Derbyſhire were worked at a very early period, certainly when the Romans were in poſſeſſion of this country, and perhaps in ſtill more ancient times. But whenever this buſineſs was firſt begun, it is reaſonable to ſuppoſe, that laws would be formed for the management and direction of it. The original inhabitants of this county, who happened to be engaged in the proſecution of mineral concerns, would ſoon perceive the expedience and neceſſity of being governed by ſome kind of regulations. But admitted this to have been the caſe, there is great reaſon to believe that their laws and cuſtoms were ſuperſeded by others introduced and eſtabliſhed by the Romans. Suetonius ſays, plurimis etiam civitatibus, et privatis veteris immunitates, et jus metallorum ac vectigalia adempta.

However it appears from Heineccius, that private adventurers were afterwards permitted to work the mines. Reſtituerant deinde iiſdem hoc beneficium ſequentes principes, ſed ea lege, ut certum inde canonem metallicum ſolverent. We are alſo informed what this canon metallicus was. Cuncti, qui per privatorum loca ſaxorum venam laborioſis effoſſionibus perſequentur, decimas fiſco, decimas etiam domino repraeſentent. The adventurers were to pay a tenth to the crown and a tenth to the owners of the land. In the law immediately following that which I have above quoted mention is made of the procuratores metallorum, officers, that exactly anſwer to the berg-maſters or as the word is now pronounced Bar-maſters of the preſent time. For berg ſignifies a mine, as appears from the word Rabbit burrough ſtill in uſe.§

Since the time of the Romans the mineral laws of Derbyſhire have undergone ſeveral changes and regulations. It has been already obſerved, that Edward the firſt directed the ſheriff of the county to call a meeting at Aſhbourn of ſuch perſons as were beſt acquainted with the rights and cuſtoms of the mines. And it appears, that on this occaſion the miners petitioned, that theſe rights and cuſtoms ſhould be confirmed to them under the great ſeal by way of charity in conſideration of the danger to which they were expoſed. In the reigns of king Edward the ſixth and queen Mary alſo the mineral laws received ſome additions and improvements. Nay even within the ſpace of a few a few years paſt new regulations have been propoſed, approved, and paſſed into laws at the great Barmote courts of the high Peak and Wapentake of Wirkſworth.

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§ For this derivation of the mineral cuſtoms and laws of Derbyſhire from thoſe eſtabliſhed by the Romans I am indebted to the Rev. Mr. Gifford of Duffield.

It is not my deſign to enter into a minute detail of theſe cuſtoms and regulations. I mean to take notice of ſuch only, as may tend to convey a general idea of the manner, in which the mining buſineſs is conducted. But to give a clear illuſtration of this matter it will be neceſſary firſt to remark that the principal part of the county, where lead ore is found in conſiderable quantity is known by the name of the king's field. Nearly the whole Wapentake of Wirkſworth comes under this denomination. This does not appear always to have been the caſe, for in the time of the Saxons it belonged to the Abbey at Repton. But Mr. Pegge imagines that in the year 874, when this religious houſe was deſtroyed by the Danes, it was eſcheated to the crown, ſince it appears to have been in its poſſeſſion, when Domeſday book was compiled. As to that part of the king's field, which is ſituated in the high Peak, I apprehend, that at leaſt ever ſince the Norman conqueſt it has been the property of the crown, and in the ſame cuſtody with the caſtle.

Now all that part of the county which comes under the denomination of the king's field has been from time immemorial let upon a leaſe. The preſent farmer of the mineral duties in the high peak is the duke of Devonſhire, and in the Wapentake of Wirkſworth the widow of the late —— Rolles, Eſquire. They have each a ſteward and barmaſters in the different diſtricts, which they hold under the crown. The ſteward preſides as judge in their Barmote courts and with twenty-four jurymen choſen every half year determines all diſputes, which ariſe reſpecting the working of the mines. For this purpoſe they meet twice in the year, and if requiſite may upon proper notice be ſummoned ſtill oftener. In the high Peak the courts are held at Moneyaſh, and in the wapentake at the town of Wirkſworth.

The office of the bar-maſter conſiſts of various branches. But the moſt material are putting miners into poſſeſſion of veins, which they have diſcovered, and collecting that proportion of ore, to which the Leſſee of the crown, or lord of the manor has a claim.

When a miner has found a new vein of ore in the king's field, provided it be not in an orchard, garden, or high road, he may acquire an excluſive title to it by a proper application to the bar-maſter of the liberty. His firſt buſineſs is to acquaint him with his diſcovery and intentions, and to deſire that he will give him poſſeſſion. The method of doing this, is in the preſence of two jurymen, marking out in a pipe or rake work two meares of ground each containing twenty-nine yards, and in a flat work fourteen yards ſquare. In recompence for his trouble the barmaſter is entitled to the firſt diſh of ore, which is gotten.

However if a miner neglects to avail himſelf of his diſcovery beyond a certain limited time, he is liable to be deprived of the vein, of which he has received poſſeſſion. The barmaſter may then diſpoſe of it to any perſon, who may wiſh to try his fortune in it.

The other part of the barmaſter's duty, which conſiſts in ſuperintending the meaſurement of the ore, and taking that proportion, to which the leſſee of the crown, or lord of the manor is entitled, is attended with ſome trouble and difficulty. For theſe claims are exceedingly various in different parts of the high and low Peak.

But to give a clear idea of them, the ſeveral kinds and ſizes of ore ſhould be firſt ſpecified and diſtinguiſhed from each other. The largeſt ſort is called Bing, and is always very good. The next in ſize and of almoſt equally good quality is known by the name of Peſey. A third kind, which paſſes thro' the ſieve when it is waſhed, is termed Smitham. Beſides theſe, there is a ſtill finer ſort, which is caught by a very ſlow ſtream of water, and the particles of which are as ſmall as flour. It is ſtiled Belland and is inferior in value to every other ſpecies of ore, on account of the foreign matters, which are mixed with it.

All theſe ſorts of ore are now ſubject to a toll or duty, tho' the two laſt were once conſidered as exempt. In the year 1761 the duke of Devonſhire aſſerted and eſtabliſhed the claim of the crown in the high Peak; and the ſucceſs of his Grace induced Mr. Rolles, a very ſhort time after, to conteſt the point with the miners in the Wapentake. Accordingly for this purpoſe he threw the cauſe into chancery, and obtained a verdict in his favour. So that now all ſorts of ore are ſubject to a toll throughout the Peak of Derbyſhire.

However the proportion of ore, which is due, and that which is really taken, are in very few places the ſame. The farmers of the mineral duties ſeldom inſiſt upon the full extent of their claims. The diſh or hoppet, as it is ſometimes called, by which the ore is meaſured, contains, in the low Peak fourteen, and in the high, ſixteen pints. And to ſtate with preciſion the ſeveral deductions, which are made from the earnings of the common miner, it will be requiſite to mention what number of theſe meaſures may be demanded, and what number is actually taken in each of theſe diſtricts.

That part of the king's field, which is ſituated in the Wapentake of Wirkſworth is divided into eight liberties. Now theſe, tho' under the ſame juriſdiction, leaſed by the ſame perſon, and ſubject to the ſame duties, pay in very different proportions. In Bonſal and Braſſington every thirteenth diſh is due, but a twenty-fifth only is taken. Neither of them is ſubject to a tithe. Cromford pays every thirteenth diſh. The tithe, Smitham & Belland excepted, is every fortieth. In Elton the twenty-fifth is taken and every tenth diſh is due as tithe to the duke of Rutland. At the capital mines he takes every nineteenth, but at the ſmaller ones at diſcretion. One half of the liberty of Matlock pays a thirteenth, and the other a twenty-fifth, but neither of them any tithe. In Wirkſworth, which produces a larger quantity of ore, than any other liberty, a twenty-fifth is taken in ſome places, and a thirteenth in others. A fortieth is due to the Vicar as tithe. The reaſon, why a larger proportion of ore is taken in ſome places, than in others, is, that the former reſiſted the claims of the leſſee of the crown, when he aſſerted his right to every thirteenth diſh of all kinds of ore.

Theſe obſervations have ſolely a reference to the king's field. But in the low Peak there are mines alſo in grounds, which are private property. In this caſe agreements are made between the owner of the land, and the labouring miners; and it concerns each party to engage on terms the moſt advantageous to themſelves.

The cuſtoms and regulations concerning the mines in the high Peak are not materially different from thoſe, which prevail in the Wapentake of Wirkſworth. A meare in the king's field is here ſomewhat larger. It meaſures thirty-two yards. Two meares are given to every miner, who diſcovers a new vein. The next is claimed for the king, and afterwards the miner has a power of diſpoſing of the vein, in what manner he pleaſes.

In the king's field every thirteenth diſh of ore is due to the crown, but a twenty-fifth is commonly taken. The tithe is every tenth, of which a third is paid to Philip Gell of Hopton, Eſq. The duke of Devonſhire as leſſee to the crown generally takes every fifteenth diſh for his ſhare of lot and tithe. Mr. Gell is entitled to the above proportion of tithe in the liberties of Bakewell, Hope, Tideſwell, and Aſhford.

Caſtleton is a royal manor. It pays every twenty-fifth to the crown, and every tenth diſh as tithe to the Vicar. Beſides this manor, and the different liberties contained in the king's field, there are ſeveral private lordſhips in the high Peak.

In Aſhford which belongs to the duke of Devonſhire, the tolls are the ſame, as in the king's field. Eyam and Stoney Middleton are alſo private property, and belong to the families of Devonſhire, Bruce, and Thanet. The lot is every thirteenth diſh, which is taken. The tithe, which is due to the Rector of Eyam, is a penny for every diſh. Tideſwell is a private lordſhip and belongs to Mr. Archer. The lot or toll is every thirteenth; the twentieth is taken. Litton belongs to Lord Scarſdale; every twentieth diſh is taken, but it is not ſubject to a tithe. Peak foreſt is the ſole property of the duke of Devonſhire, and is under the ſame regulations with Litton. There are a few other liberties, in which lead ore is gotten, but the laws and cuſtoms, by which they are governed, bear ſo great a reſemblance to thoſe, which have been mentioned, that it is needleſs particularly to recite them.

Beſides the claims, which have been mentioned, there is another called cope. In the Wapentake it is four-pence, and in the high Peak ſix-pence per load, and is paid by the buyer of the ore to the farmer of the mineral duties, or the lord of the manor.

The demands of the crown and clergy being ſatisfied, the next buſineſs of the miner is to diſpoſe of his ore to ſome of the merchants and ſmelters, who reſide in the neighbourhood. In the ſale of this article the price is in a great meaſure determined by its particular ſpecies and quality. Tho' the ſeveral kinds of ore are always ſold together, yet it is evident, that that, which contains the greateſt quantity of Smitham and Belland, is, on account of their mixture with other ſubſtances, the leaſt valuable.

Before the lead ore is diſpoſed of, it is beaten or knocked into ſmall pieces, waſhed, and ſifted. This part of the buſineſs is performed by women, who are hired by the miners, and earn about ſix-pence a day.

When the ore is properly cleanſed and dreſſed, it is carried to ſome furnace in the neighbourhood to be ſmelted. Now theſe furnaces are of two kinds, the hearth and the cupola. But it appears, that there was another method of obtaining lead from its ore, before either of them came into uſe. About two hundred years ago, the buſineſs of ſmelting was carried on by means of wood fires upon ſome of the higheſt hills in the neighbourhood of Wirkſworth and Crich. The weſtern ſide was always choſen for that purpoſe, ſince the winds were found to be the moſt conſtant and laſting from that quarter. Such an irregular and uncertain method of ſmelting was followed and ſomewhat improved by the invention of the hearth furnace. This is however of but rude and ſimple conſtruction. It conſiſts of large rough ſtones placed in ſuch a manner as to form an oblong cavity about two feet wide, fourteen long, and two deep into which fuel and ore are thrown in alternate layers. The heat required is produced by a pair of large bellows worked by a water wheel, and applied about five or ſix inches from the bottom of the cavity. The fuel conſiſts of wood and coal, and when the heat becomes ſtrong enough to ſmelt the ore, the lead trickles down and at an opening in the front of the furnace runs out thro' a ſmall channel made for the purpoſe. It then falls into a trough placed before the hearth, from whence it is laded into moulds, and caſt into blocks called half pigs. The lead procured in this way is very ſoft, pure and ductile; but a conſiderable quantity is always found to remain in the ſlags. On this account it becomes neceſſary,

ceſſary, that they ſhould paſs a ſecond time thro' the fire. They are accordingly put into another furnace, called a ſlag furnace. The heat required for ſmelting them is produced by a fire made with coaks, and is more intenſe than in the former inſtance. But the metal extracted by this means is inferior in quality and value to that, which was obtained by the firſt proceſs, and is diſtinguiſhed by the name of ſlag lead.

At preſent a very ſmall proportion of lead ore is ſmelted in this way. I believe there are only two hearth furnaces in Derbyſhire, one ſituated at Rowſley near Bakewell, and the other on the weſt ſide of the eaſt moor at a ſmall diſtance from Hatherſage. Nor ſhall we think, that they have without ſufficient reaſon given place to the cupola furnace, if we attend to the advantages, which ariſe from the conſtruction and uſe of the latter.

The cupola furnace is ſaid to have been invented by a phyſician named Wright. It was introduced into Derbyſhire about fifty years ago, but has received ſome improvement ſince that time. It is of an oblong form, ſomewhat reſembling a long, but not very deep cheſt, the top and bottom of which are a little concave. It will hold a ton of ore, but its uſual charge is only eighteen hundred weight. At one end the fire is placed upon iron bars under an arched roof, and at the height of three or four feet from the floor of the building. At the other extremity a perpendicular chimney is built. When the fire is kindled and every part, excepting the two ends, is cloſed, the flame is neceſſarily drawn through the whole length of the furnace, and by its reverberation from the roof the ore is ſmelted without ever coming into immediate contact with the fuel.

The time, which is required for this proceſs, is various and indeterminate. Some ores may be worked in ſix, whilſt others take nine hours. This difference of time is owing partly to their reſpective nature, and partly to the minerals, which are attached to them. The ore, which is united with ſpar, is the moſt eaſy of fuſion. For this reaſon, when the buſineſs goes on but ſlowly, it is cuſtomary to collect and throw a ſmall quantity of this ſubſtance into the furnace. But this is not always neceſſary. In general the different minerals, which are combined with the ore, aſſiſted by a little coal ſlack, are ſufficient to ſmelt it.

When the ore is put into the furnace great care is taken to begin with a ſlow heat. Without ſuch a precaution a conſiderable quantity of lead would be loſt. Every kind of ore contains a proportion of ſulphur, and were this expelled and diſſipated by a ſtrong heat, the lead would be drawn up the chimney along with it. Whereas a ſmall fire gradually ſets it at liberty and the current of air occaſioned by it is not ſtrong enough to bear away the lead, which is heavier than the ſulphur. When the ore at the ſurface is ſufficiently ſmelted, that, which lies beneath, is turned up, and a freſh fire is made. In this ſtate it remains ſome hours. The fire is then raiſed a third time, and the ore continues undiſturbed, till it is entirely ſmelted.

When the ore is thus brought into a fluid ſtate, preparation is made for drawing it off. For this purpoſe there are two orifices formed at different heights on the ſame ſide of the furnace. Through the higher the ſlag, which ſwims like water upon the ſurface, is let off. To ſeparate what remains entirely from the lead it is uſual to throw into the furnace a ſmall quantity of quick lime, by which it is abſorbed and dried up. The lead being purified by this means is drawn off thro' the lower orifice into an iron veſſel which is placed beneath to receive it.

However ſome ſlag is generally left at the bottom of the furnace. This is worked over again with a ſtrong heat, and, when it is ſufficiently ſmelted, quick lime is thrown in, as before, to ſeparate the metal from it, and the lead is drawn off as in the preceding part of the proceſs. Yet, after all, a ſmall quantity of ſcoriae will remain at the bottom of the furnace, which is taken from thence with iron rakes.

From the veſſel, into which the lead is drawn, it is taken with ladles and poured into moulds of various ſizes. For it is neceſſary, that the pieces or blocks caſt in them ſhould be of different weights according to the market for which they are intended. Two of them make a pig, which ſold at the works is 220½ of 112, at Hull 190½ of 120, at Bawtry 210½ of 112, and at London 190½ of 112. Eight of theſe make a fodder or ton.

Lead is not always diſpoſed of in this ſtate and form. Sometimes it is firſt rolled into ſheets at works erected for that purpoſe in the neighbourhood of the furnaces.

A conſiderable quantity of this metal is alſo converted into red lead by the merchants and ſmelters, who reſide in different parts of the county. This proceſs is performed by calcination in a kind of oven, the floor of which is divided into three parts. The ore is placed within the middle diviſion, and the fire on each ſide in the other two ſpaces. The flame is reverberated from the roof and falling upon the ore reduces it into a powder.

The ſucceſs of this buſineſs greatly depends upon a nice adjuſtment of the heat. If it be very intenſe, the calx of the lead becomes a dirty white or grey colour. On the contrary ſhould the fire be ſmall and ſlow, it is of a yellow or orange colour. It is therefore a matter of great conſequence, that a proper medium ſhould be obſerved between theſe two extremes. At the commencement of the proceſs a thin pellicle or ſkin ſpreads upon the ſurface of the lead, which is taken off as faſt as it is formed. Nor does this appearance ceaſe, till the greateſt part of the lead is reduced to a powder. However it ſeldom happens, that the metallic principle is entirely deſtroyed by this operation. It therefore becomes neceſſary to ſeparate the uncalcined part from it. For this purpoſe it is ground very fine in a mill, and waſhed. The calx or powder being then again expoſed to the heat of the furnace, and continually ſtirred, become uniformly of the ſame red colour and is rendered fit for uſe.

In making red lead a certain proportion of the ſlag lead is always employed. In calcining a ton about eighteen hundred weight is generally uſed. This quantity, when mixed with the ore lead, is thought to quicken its reduction into a powder.

It is a well known, but at the firſt ſight extraordinary fact, that tho' during calcination much of the ſubſtance of the lead is diſperſed into the air, yet it receives a conſiderable increaſe in its weight from this proceſs. Dr. Watſon* ſays, that three tons when entirely reduced, do not weigh more than fifty-two hundred. But he obſerves, that notwithſtanding ſo great a loſs a ton or twenty hundred weight generally give twenty-two hundred of red lead. This fact has been clearly accounted for by diſcovering that it imbibes a large quantity of air during the proceſs, which is the occaſion of the increaſe in its weight.

Some years ago attempts were made to extract ſilver from the lead. But there is not now any work of this kind in Derbyſhire.

Another mineral ſubſtance contained in lead ore is ſulphur. When the ore is ſmelting, as it has already been obſerved, it riſes upon the ſurface, and is carried up the chimney. By means of a pipe or long vault connected with the chimney a conſiderable quantity has been collected at a furnace in Middleton dale. Dr. Watſon ſays, that Derbyſhire lead ore contains between an eighth and a ninth part of its weight of ſulphur. And yet no attempts have been made to ſave it excepting at the above-mentioned place and at Hatherſage.

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* Chemical eſſays.

It is not eaſy, if poſſible, to aſcertain the exact annual produce of the lead mines in Derbyſhire. At almoſt every period of time ſince we have any account of their having been worked, it appears to have been exceedingly fluctuating and variable. In the year 1782 the mines in the Wapentake of Wirkſworth yielded 1306 fodders, or tons of lead, and thoſe in the liberty of Crich about 200. At Aſhover during the laſt ſix years preceding the above time the mines had produced annually upon an average 2011 tons. What quantity of lead ore ariſes from thoſe in the high Peak every year, I have not been able to learn. But if it be eſtimated at 2000 tons, I apprehend the calculation will not be very diſtant from the truth. So that the preſent annual produce of the lead mines in Derbyſhire may be computed on an average at between five and ſix thouſand tons.

That branch of the mineral buſineſs in this county, of which I am now ſpeaking, has been generally thought for ſome years paſt to be in a declining ſtate. Whether the ſtrongeſt veins of lead ore in the hills be exhauſted, or not yet diſcovered, perhaps cannot with certainty be determined. But it is almoſt univerſally admitted that the produce of the mines is not ſo large now, as it was twenty years ago. However to remedy and ſupply this deficiency every poſſible expedient, which can be thought of, is daily tried. At ſome furnaces the ſlags are working over a ſecond time, which were formerly thrown aſide as uſeleſs, and undeſerving of further notice. In various parts of the high and low peak many perſons are conſtantly employed in waſhing heaps of rubbiſh, which have been formed time immemorial by the working of the mines. It muſt be acknowledged that this practice, which is called buddling for ore, was introduced above fifty years ago into the county by ſome Welch and Corniſh miners. But it has been lately followed with more than uſual aſſiduity, and while lead is ſo ſcarce and valuable an article, the employment will afford a tolerable ſubſiſtence to thoſe, who are engaged in the proſecution of it. Yet, theſe are but ſmall exertions, when compared with others, which are making in Derbyſhire for the revival and ſupport of the mineral buſineſs. At Wirkſworth, Youlegrave, and Caſtleton very large ſoughs or levels are driving, and nearly completed, which it is expected, will free many valuable mines from the great body of water, with which they are at preſent troubled. 20,266l. 12s. 1d. excluſive of intereſt, have been already expended upon the Hilcar ſough alone, which is driving from Darley Dale towards Youlegrave. Its whole length, when finiſhed, will be about two miles.

Fire engines have alſo been lately employed for the purpoſe of relieving the mines from water. One in particular invented by Mr. Bolton near Birmingham has been employed with great ſucceſs in the Gregory mine at Aſhover.

If we conſider the produce of this valuable mine we ſhall be inclined to believe, that the richeſt veins of lead ore in Derbyſhire are not entirely exhauſted, tho' the working of them may in ſome inſtances be attended with much labour and expence. That a proper idea may be formed of the vaſt wealth, which has been derived from this ſingle undertaking, I would obſerve, that from the year 1758 to 1783 it yielded lead to the value of 105,986l. 0s. 3½d. and that during this period it produced 1511 tons annually upon an average.

It cannot be reaſonably ſuppoſed, that there are many ſuch veins in the county. But I am informed by perſons well acquainted with the mineral part of Derbyſhire, that beſides thoſe which are now working, there are ſeveral valuable ones, which cannot be purſued on account of the great ſtrength of water in their neighbourhood.

Whether the proprietors of the lead mines in Derbyſhire, when conſidered as a collective body, really derive benefit from their purſuits, may be juſtly regarded as a very queſtionable point. However it is a matter, which will not admit of diſpute, that this branch of buſineſs is of conſiderable national advantage. If thoſe, engaged in mineral concerns, are not upon the whole gainers, they certainly furniſh employment and ſupport to a numerous claſs of labouring people, and ſupply the kingdom with an article, which muſt be drawn from ſome other part of the globe. It muſt be confeſſed, that there is ſcarcely any buſineſs which has ſo much of the appearance of adventure. But conſidering it even in the light of a lottery, it certainly is not productive of thoſe pernicious conſequences, with which ſuch engines of fortune are uſually attended. Entire blanks are ſeldom drawn. Some quantity of ore is generally met with; tho' in undertakings of this kind the profits are not always adequate to the expence of purſuing them. When a vein is diſcovered, it is not poſſible for ſome time to aſcertain its value. It may be worked ſome years, before this is fully known. In different parts of the ground it appears with different degrees of ſtrength. Some veins will occaſionally yield a prodigious quantity of ore in a very ſhort ſpace of time. I have been informed, that the Portaway mine near Winſter lately produced ore to the value of 4000l. in ſeven weeks. Such favourable changes ſupport the ſpirits of the miners; and whilſt they continue to take place, the working of the lead mines in Derbyſhire will never become totally diſregarded and neglected.

SECTION I.

Iron ore and works.

FROM the account, which has been given of the lead mines of Derbyſhire, it appears, that the ore of this metal is found in very conſiderable quantity in the county. But ironſtone, or the ore of iron is met with in ſtill greater abundance. It occurs throughout all that large tract of land, where coal has been diſcovered, excepting at Chinley hills near Chapel le frith.

The depth at which it lies in the earth is exceedingly various. This is evident from a bare inſpection of the catalogue of the meaſures in that part of the country, where iron-ſtone is found. It appears even in the ſame ſhaft at various diſtances from the ſurface of the ground. Nor is it leſs manifeſt, that from the great dipping of the meaſures in ſome places the iron-ſtone will frequently baſſit to the day. When this is the caſe, it is ſeen at the ſurface, and is taken out of the ground to the depth of eighteen or twenty yards. For this purpoſe a hole is made about the ſame ſize with the ſhaft of a coal pit. This is gradually enlarged every way, as they go deeper into the earth, and at length the opening aſſumes the ſhape of a bell. It is uſual not to deſcend lower than eighteen yards. Freſh ground is then broken and another hole of the ſame form and depth is begun and ſunk in the earth. By this means the ſoil near the ſurface is intermixed with the lower beds and rendered entirely uſeleſs. On this account land generally receives greater injury from the working mines of iron-ſtone, than thoſe of coal. And unleſs the beds are very valuable, it is reckoned bad policy to diſturb the ground for the ſake of the ore which it contains.

The thickneſs of the beds of iron-ſtone is various. This may likewiſe be ſeen from examining the catalogue, to which I have juſt now referred. They are found from two to twelve inches thick.

The moſt valuable beds of iron-ſtone, which have yet been diſcovered, are ſituated in Morley park near Heage, at Wingerworth, Cheſterfield, and Stavely. Accordingly in each of theſe places furnaces have been built for the purpoſe of converting it into metal. The foundations of one have alſo been laid very lately between Dale and Stanton. But the execution of the undertaking is at preſent ſuſpended, if not entirely given up. The iron-ſtone at Wingerworth in particular is found in ſo great abundance, and of ſo good a quality, that the land, in which it lies, is valued at 100l. an acre.

The method of ſmelting iron-ſtone as practiſed in Derbyſhire is nearly the ſame at all the works, which I have viſited. The furnaces employed for this purpoſe are not materially different from each other in either their ſize or conſtruction. By giving a deſcription of any one in particular, I may therefore hope to convey a general idea of the manner, in which iron is obtained from its ore. With this view I have procured an elevation of the furnace erected by Walter Mather, Eſq; at Stavely. By deſcribing its various parts, and their uſes, I ex-

I expect that I ſhall be enabled to explain this buſineſs in a clear and intelligible manner. Plate, figure 2.

Formerly the furnaces employed for ſmelting iron-ſtone were built ſquare. But now they are generally erected in a circular form; and that at Stavely in particular bears a great reſemblance to a glaſs-houſe. A A is the outſide wall. B B is a lining of ſtone and ſand, deſigned to render the wall ſo cloſe and compact, as to exclude all air. C C is the inſide of the furnace. D D are the boſhings; their uſe is to ſupport the materials, and prevent the metal from deſcending too ſuddenly, and congealing at the bottom of the furnace, before it can be drawn off. E is the hearth, in the front of which is a dam-ſtone. This is five feet, ten inches from the back-ſtone of the hearth. One ſide of the dam-ſtone is formed with ſand and is broken down, when the metal is drawn off. F is the timp, which is about twenty-four inches above the bottom of the hearth. G is the mouth of the furnace, thro' which all the materials are thrown in. At H the blaſt is applied to encreaſe and quicken the heat of the fire. I I is the gang way or path, along which the materials are carried in wheel-barrows to the mouth of the furnace.

K is a ſmall dwelling for a workman. L L L L are arches, which ſupport the gang way; and M is a room, in which the materials are laid ready for uſe.

When the furnace is built, ſome time is required to prepare it for uſe. A ſmall fire is firſt made under the timp and fuel is continually added, till it is raiſed as high as the mouth of the furnace. The blaſt is not employed, before the furnace is filled to about half its height, leſt a too ſudden and ſtrong heat ſhould injure the walls.

As ſoon as the furnace is properly ſeaſoned, the proceſs of ſmelting the iron-ſtone begins. Fuel, ore and flux are continually put in, both day and night, in regular ſucceſſion; nor is the fire ſuffered to go out, till the furnace wants to be repaired, or ſome other circumſtance renders it neceſſary to extinguiſh it. The fuel is generally coak, tho' charcoal has been ſometimes uſed. But limeſtone is the conſtant and univerſal flux.

However before theſe different ſubſtances are mixed, it is neceſſary, that the ironſtone ſhould undergo ſome degree of preparation. When it is taken out of the ground, and carried to the place, where the furnace is erected, it is interlaid, with coak firſt and then with coal ſlack, in beds, and burnt in the open air. The action of the fire upon it having ſeparated many foreign matters, which adhered to it, it is then ſcreened, broken into ſmall pieces, and carried to the furnace.

When they charge the furnace, they begin with coak, upon which they lay a bed of iron-ſtone and then one of limeſtone. Theſe different ſubſtances they continue in this order to put in, to the amount of the quantity, which is required. The ſmelting of the ore is urged by the application of a blaſt produced by a pair of cylinders, which are worked by a fire engine or water wheel. When the fuſion of the iron-ſtone commences, the ſmelted matter paſſes thro' the layers of coak and limeſtone; and theſe likewiſe being vitrified greatly facilitate and at length compleat the reduction of the ore. The metal, which during this time has been collecting at the bottom of the furnace, is let out by opening one ſide of the dam-ſtone with iron-crows. It then runs into a bed of ſand, where pigs are formed, 3½ feet in length and 100lb. in weight.

The length of time, which is required for the fuſion of iron-ſtone, is various, and in a great meaſure depends upon the ſize of the furnace, and the quantity of ore, with which it is charged. At ſome works it is uſual to tap once in eighteen, and at others twice in twenty-four hours.

By mixing the ore, flux, and fuel in different proportions different kinds of metal are produced. When that, from which ſhot and ballaſt are made, is wanted, it is cuſtomary to every nine baſkets of ore to add four of coak and two of limeſtone. But with this quantity of fuel and flux it is not neceſſary to mix more than ſeven baſkets of iron-ſtone to produce forge metal. When ſoft metal, from which caſt goods are made, is required, it is uſual to put five and a half of ore to four of coak and one and a half of limeſtone.

Theſe are the general proportions made uſe of for the ſmelting of iron-ſtone. However there are particular circumſtances, which ſometimes cauſe a trifling variation. As the metal is not obtained with equal eaſe from every kind of ore, it is requiſite occaſionally to diminiſh or encreaſe the proportion of limeſtone and fuel. This is more eſpecially the caſe in regard to the latter. Charcoal, which produces a greater degree of heat than coak, is never uſed in ſo large a quantity for obtaining any particular kind of metal. But wood being a ſcarce article in Derbyſhire cannot be procured with ſo much eaſe, and at ſo moderate an expence as coal. For this reaſon charcoal is not at preſent employed for ſmelting iron-ſtone in any part of the county, with which I am acquainted.

When the metal is obtained from its ore, it is brittle, and wants the malleability of iron. To give it this property it is therefore carried to the forge, where it is wrought into bars. Metalurgiſts are not agreed in regard to the cauſe of that brittleneſs, which all unwrought iron is known to poſſeſs. Some think it is owing to the preſence of a portion of vitreous matter. Others aſcribe it to the imperfect reduction of the iron and to its containing a quantity of calx. It has alſo been ſuppoſed, that arſenic or zinc render the metal brittle. But the moſt prevalent opinion is, that this property is owing to its imperfect reduction, and the portion of metallic calx interpoſed between its parts.

The quantity of iron which is annually produced in this county has lately been very conſiderable. At preſent it amounts to about 5600 tons. This eſtimate was made by taking an average account of the metal, which was extracted every week at the ſeveral furnaces in the county.

SECTION II.

Calamine mines and works.

LAPIS calaminaris, or calamine has ſo little of the appearance of an ore, that only thoſe, who are well acquainted with its nature, could know it to be one. The moſt common ſort has ſo great a reſemblance to ſome kinds of limeſtone, that it can ſcarcely be diſtinguiſhed from them. There is however an inferior ſpecies of calamine, generally called black jack, which has ſome degree of metallic ſplendor, and may be eaſily miſtaken for lead ore. The great reſemblance of theſe two mineral ſubſtances to each other has given room for the practice of great fraud in the ſale of the latter. Some years ago a large quantity of black jack was bought for lead ore. This inſtance of impoſition has rendered the merchants more cautious. So that deceits of this kind, I believe, are now very ſeldom, if ever, attempted.

From theſe obſervations it may be preſumed, that calamine has not been long known and attended to in Derbyſhire. A century ago the miners were entirely ignorant of its properties and value. It is not twenty years ſince its uſe in the compoſition of braſs was made a ſecret in this county. But this being publicly known has excited the general attention of miners to this ſubſtance in various parts of the high and low Peak. The chief places, where it has been diſcovered, are Caſtleton, Cromford, Bonſal, and Wirkſworth.

Calamine occurs at various depths in the earth. It is generally found near a vein of lead ore. Sometimes theſe two mineral ſubſtances are diſcovered mixed together, or run a conſiderable way along the ſide of each other. But it more frequently happens, that one immediately ceaſes, when the other begins to appear. It is a common obſervation of the miners, that a good vein of both is never found in the ſame place.

This ore of zinc generally lies in a bed of yellow, or reddiſh brown clay. Theſe beds bear a great reſemblance to pipe works, and conſiſt of diſtinct lumps of various ſizes, and irregular ſhape. The direction in which they are found, is the ſame with the dip of the meaſures in that part of the country, where they appear.

From the mines calamine is carried to the furnace, which is built near a rivulet or ſmall ſtream of water. Here it is firſt waſhed in the current, and cleanſed from the ſoil or clay, which adheres to and is mixed with it. It is then, in a veſſel filled with water, waſhed again in ſieves, and the foreign matters are picked out. Theſe are chiefly cauk, ſpar, and lead ore, and all excepting the laſt are thrown away.

When by repeated waſhing and picking the ore appears to be ſufficiently purified, it is calcined in a reverberatory furnace of nearly the ſame form and conſtruction with the cupola, which is uſed for ſmelting lead ore. The chief reſpect, in which they differ from each other, is, that the furnace, of which I am ſpeaking, has not a concave, but flat roof and bottom. The time required for calcining the calamine is about four or five hours; and during the proceſs the ore is frequently ſtirred up with iron rakes. When it is taken out of the furnace, it is picked again, and being ground into a fine powder, and waſhed once more, becomes fit for uſe.

Dr. Watſon* ſays, that the calamine annually raiſed in Derbyſhire amounts to about 1500 tons, tho' 60 years ago they did not raiſe 40 tons in a year. I do not know at what time this eſtimate was made; but from the beſt information I can obtain there does not appear to be more than 500 tons at preſent annually collected from the ſeveral places, where this article is found.

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* Chemical eſſays, vol. 4. page 8.

Derbyſhire calamine in its native and crude ſtate is ſold from 35 to 40 ſhillings a ton, but when prepared for uſe, it is valued at 5 or 6 guineas. It appears, that it does not bear ſo good a price as that, which is gotten about Mendip in Somerſetſhire. For Dr. Watſon informs us, that at this latter place a ton in an undreſſed ſtate is ſold for 65 or 70 ſhillings, and after calcination for 8 pounds.

A ton of crude calamine, as dug from the mine is reduced by the various proceſſes it undergoes, before it becomes ſaleable, to about 12 hundred weight and hence it has loſt 8 parts in 20. Of 8 hundred weight thus loſt in a ton $6\frac{2}{3}$ may be eſteemed fixed air. The remaining part amounting to $1\frac{1}{3}$ conſiſts of ſome impurities, which have been picked out or waſhed away, and of ſome portion of the metallic parts of the calamine, which is inflamed and driven off during calcination.§

Blende or black jack, loſes different proportions during calcination. Some kinds loſe a fourth and others a ſixth of their weight.‡

SECT.

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§ Chemical eſſays, vol. 4. page 16. † page 19.

SECTION III.

Copper ore.

COPPER ore has yet been found only in very ſmall quantity in Derbyſhire. Pieces about twelve inches in circumference, and detached from any vein are frequently met with at Matlock. Others of a much larger ſize have alſo been found at Bonſal and converted into Copper. They were diſcovered, ſome lying on the ſurface of the ground, and the reſt in a neighbouring walled fence. Some years ago a ſlender vein of copper ore was found and worked at Great rock Dale betwixt Tideſwell and Buxton. And lately another has been met with at Ruſſop Edge near Chapel le frith. No advantage has at preſent been derived from this diſcovery. However from an expectation of meeting with ore in ſome quantity three mineral gentlemen in the neighbourhood took a leaſe of the land where it is found. But I have not heard, whether they will proſecute their intentions of working the vein.

SECTION IV.

Coal mines.

THE uſe and value of coal have long been known in Derbyſhire. Pits were dug for getting this mineral in the liberties of Norton and Alfreton as early as the reign of Edward II. At this time Thomas de Chaworth,† lord of Alfreton, gave to the monks of Beauchief licence and authority to ſupply themſelves with coal from either of theſe places in what quantity they choſe.

At preſent coal is found in very great abundance in Derbyſhire. One almoſt uninterrupted bed extends thro' that large tract of clayſtone land, of which ſuch frequent mention has been made, as lying on the eaſtern border of the county. It is found alſo, as it has been already obſerved, at Newhall, Meaſham, Chinley, Hartington upper quarter near Buxton, and at Calke.

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† Charter of Edward II. Dugdale Mon. Angl. vol. 2. page 609.

Coal is met with at various depths in the earth. In ſome ſituations ſeveral beds are paſſed thro' by the ſame ſhaft. But the upper ones are both thin and ſoft, and the coal is ſeldom got of which they conſiſt. The hard coal alſo in different places is found at different diſtances from the ſurface. This change is always obſerved to happen in the neighbourhood of the faults. On paſſing over them coal will be ſometimes found lifted up or thrown down 120 yards from the ſituation, in which it was left on the contrary ſide.

At the firſt ſight the intervention of theſe walls of clay ſeems to be a great impediment to the proſecution of this branch of mineral buſineſs. And it muſt be acknowledged, that whenever they occur, there is always ſome difficulty in diſcovering again the exact ſituation of the bed of coal on the contrary ſide. But this inconvenience is in a great meaſure counterbalanced by an advantage, with which they are ſometimes attended. They ſerve to guard the mines from ſtrong currents of water, with which they would be troubled, if theſe natural barriers were removed. For it is found, that when they are broken through, the water ruſhes forward with great violence and abundantly ſhews the imprudence of ſuch a ſtep.

Thus by theſe walls of clay has the wiſe author of nature provided for the ſecurity and convenience of thoſe, who are engaged in the proſecution of this uſeful and hazardous buſineſs.

In working mines of coal, water and foul air are often found to be very troubleſome. To relieve them from the latter they have recourſe to the ſame means, which are employed in lead works. But to free the pits from inflammable and mephitic air, with one or both of which they are often troubled, a method ſomewhat different is purſued. At moſt works there is, beſides the large ſhaft, by which the coals are drawn up, a ſmaller one at the diſtance of a few yards. This is about 4 feet wide and 15 or 16 feet deep, and from the bottom of it a pipe is carried into and down the larger ſhaft to that part of the mine, where the men are at work. A veſſel of burning coal holding about four pecks is then ſuſpended in the ſmaller ſhaft. By this contrivance the air is immediately rarefied, and a freſh column ruſhing upwards to ſupply its place a circulation is produced and maintained in every part of the mine.

It is ſcarcely poſſible to aſcertain the exact quantity of coal, which is got in Derbyſhire every year. But it certainly is very large. For beſides what is conſumed in the neighbouring country, a conſiderable quantity is conveyed by the Erewaſh canal into Leiceſterſhire.

Tho' the ground, where coal is diſcovered in Derbyſhire, be for the moſt part private property, yet the coal and ironſtone in waſte lands in the pariſh of Alfreton belong to the crown, but are now leaſed by Tho. Thoroton, Eſq; of Screveton in Nottinghamſhire. I am alſo told, that by purchaſe he has a right to both theſe minerals in the encloſures, and can ſearch for them in moſt farms in the pariſh. In ſeveral other liberties the land and coal are the property of different perſons. In this caſe the owner of the coal has a right to ſink a ſhaft wherever he pleaſes, and to form a road for the convenience of carrying away this article, when it is raiſed at the pits.

SECTION V.

Origin and uſes of Plaſterſtone.

SOME remarks have already been made upon the ſituation of plaſterſtone in the earth. It is likewiſe deſerving of notice in this place, that upon clearing away the ſoil from the outſide

ſide it preſents every appearance of cryſtallization. The internal ſtate of the beds alſo tends to render ſuch a ſuppoſition very probable. It is not poſſible to ſay, at what time theſe cryſtallizations were produced. I think it ſufficient to offer this conjecture in reſpect to the power or law, by which ſuch beds were formed; and ſhall now mention a few of the moſt remarkable properties and uſes of the ſubſtance, which we are examining.

The moſt valuable plaſterſtone, which has ever been got in this county, is met with at Elvaſton. But the pits, which were ſome years opened here for getting it, are now cloſed. That which is found at Chellaſton is neither of ſo beautiful a colour, or ſo fine a texture. However it is equally adapted to anſwer the common purpoſes, to which plaſterſtone is applied. The principal demand for this article is from the potteries in Staffordſhire. It is there uſed for the formation of moulds, and is excellently calculated for ſuch a purpoſe. For when calcined, it is found to poſſeſs a remarkably abſorbent quality. The inſtant the compoſition is poured into the mould, it imbibes the moiſture, and a ſolid figure is produced.

A conſiderable quantity of plaſterſtone is alſo uſed for laying of floors in buildings. To prepare it for this purpoſe it is neceſſary, it ſhould be firſt burnt about eight hours in the open air. When this is done, it is cuſtomary to kindle a fire in the middle of the day. For the darkneſs greatly aſſiſt thoſe, who are engaged in the work, in judging, when it is ſufficiently burnt. When the fire is put out and it is properly cooled, it is beaten fine with flails and made into mortar. It is then ſpread about two inches thick upon reeds, or laths covered with ſtraw. Being afterwards left to dry a floor will be formed in the ſpace of a few days almoſt as ſolid and durable as ſtone. The expence of laying this kind of floor is in the neighbourhood about one ſhilling and tenpence a yard. But it is evident it will encreaſe in proportion to the diſtance of the place, to which the plaſterſtone is carried.

The ſubſtance, which we are conſidering, is uſed alſo for ornamental purpoſes both in its native and a calcined ſtate. In its native ſtate it is called alabaſter by thoſe, who manufacture it. As it takes a very high poliſh, it aſſumes a very beautiful appearance, when wrought into large columns, chimney pieces, vaſes and ſmall obeliſks. In a calcined ſtate it is applied to all the purpoſes of Plaſter of Paris. It is alſo mixed ſometimes with quick lime for the purpoſe of making the mortar ſet more ſtrongly, and is in this view found very uſeful for the formation of cornices and mouldings, and ſuch like ornamental purpoſes in building.

The quantity of plaſterſtone annually raiſed at Chellaſton pits is about eight hundred tons, five of which are ſent by the canal into Staffordſhire. The price of it is determined by its particular quality. The beſt is ſold at three half crowns and the inferior ſort at five ſhillings a ton.

CHAP. V.

Foſſils.

HAVING deſcribed the internal ſtructure of the earth in Derbyſhire, and enumerated the moſt valuable ores and mineral ſubſtances, with which it abounds, I ſhall now give a more particular and minute detail of the various productions of this kind, which have hitherto been met with in this county. The Foſſils of Derbyſhire are highly eſteemed for their beauty as well as intrinſic value, and have been thence introduced into the moſt elegant collections in Europe. By furniſhing a catalogue of them, I flatter myſelf, I ſhall therefore render an acceptable ſervice to thoſe who have a taſte for mineralogical purſuits.

Writers on this ſubject have diſtributed mineral ſubſtances into claſſes, either according to their external characters, or the principles, of which they are compoſed. Nor am I ignorant of the advantages, which attend ſuch arrangements. Mineralogy cannot be conveniently taught as a ſcience without being reduced to a ſyſtem. But I have no ſuch object in view in the preſent undertaking. My deſign is chiefly to give a catalogue of the various foſſil productions of Derbyſhire. I ſhall therefore do little more than mention, and deſcribe them under the two general heads of native and extraneous. Theſe are ſimple and obvious diſtinctions, and perhaps the only ones, which ſhould be admitted into a work of this kind. Thoſe, who may wiſh to ſee a more accurate and particular arrangement may conſult the excellent works of Cramer, Kenckel, Werner, Wallerius, Linnæus, Romé de l'Iſle, Daubenton, or the no leſs valuable writings of Cronſtedt, Bergman, Kirwan, M. de Chevalier de Born, M. Monet, M. de Fourcroy, and Da Coſta.

However, to give a clear and diſtinct idea of the various foſſils, which I ſhall now enumerate, it ſeems neceſſary to mention ſome of both their external characters, and conſtituent parts. I ſhall therefore take notice of the moſt ſtriking of each, which have come to my knowledge, and arrange them accordingly.

SECTION I.

Native Foſſils.

IN giving an account of the native foſſils of Derbyſhire I ſhall begin with thoſe of the calcareous kind.

Limeſtone, as I have already obſerved, is found thro' a great extent and in various parts of the county. But in different ſituations both its colour and quality are different. At Buxton, Peak foreſt and Stoney Middleton it is of a light grey colour and in the ſtate of lime is much uſed for agriculture. For this purpoſe a conſiderable quantity is not only diſpoſed of in the northern part of the county, but likewiſe carried into Cheſhire and Lancaſhire.

At Crich there are ſeveral kilns employed in burning limeſtone. When calcined it is remarkably white, and is very much valued for waſhing cielings and other ornamental purpoſes. It is generally allowed, that limeſtone of this light colour is the moſt free from metallic particles, and that, of which I am now ſpeaking, is found to be particularly well adapted to cold clay land: It has been obſerved to be not only a more efficacious manure, but alſo to bring the crops of corn a fortnight earlier than limeſtone of a darker caſt.

At Ticknal and Kniveton the limeſtone is of a very dark colour, and ſets very ſtrongly. At Kniveton it more eſpecially poſſeſſes this latter property, and in a degree very little inferior to that at Barrow in Leiceſterſhire. This property of the dark coloured limes of growing hard in water is ſaid by late writers to be owing to a mixture of mangameſe. Might not theſe be imitated or excelled by mixing a ſmall quantity of the black wad with other limes?

At Hopton there is another variety of limeſtone of a light colour, hard, but which does not bear a poliſh. It abounds with ſmall fragments of entrochi, and is much uſed for hearth, chimney pieces, floors, and ſtaircaſes. For the two latter purpoſes it perhaps has no equal, as may be ſeen by examining the ſtaircaſes at Kedleſton Hall.

I am informed, that on Braſſington moor a ſtone of a ſimilar but ſuperior nature has been diſcovered. It is ſaid, that it is more free from flaws, and in particular, that it has not that porous appearance, which is ſo obſervable in the Hopton ſtone.

Marble.

This ſpecies of calcareous ſubſtance is found in various parts of the high and low peak. It is of two kinds, black, and mottled grey.

Black marble abounds chiefly at Aſhford. There is a ſmall quantity alſo occaſionally worked at Matlock. But I have not ſeen any pieces in a poliſhed ſtate, and therefore cannot form an accurate opinion concerning its particular quality. The quarry, from which the black marble at Aſhford is procured, is ſituated on the weſt ſide of the village. It may be had in very large blocks. However, the meaſures in which it is found in their quality differ a little from one another. In general it is very black, and of a cloſe and ſolid texture. I have ſeen ſome very fine ſpecimens of it. They had received ſo high a poliſh, that they reflected objects as ſtrongly as a mirror.———This marble greatly reſembles that, which is brought from Namur in the Netherlands.

The mottled grey marble is found in a great variety of places. But the largeſt quantity is got in the neighbourhod of Moneyaſh. Tho it be remarkable for the diverſity of ſhade in its ground, it may be diſtinguiſhed into two kinds. The ground of one ſort is lightiſh grey, and that of the other has a ſlight blueiſh caſt. The former is rendered extremely beautiful by the number of purple veins which ſpread upon its poliſhed ſurface in elegant and irregular branches.

But the chief ornament of the mottled grey marble is the number of entrochi, with which it abounds. The longitudinal and tranſverſe ſections of them produce an almoſt incredible variety in its figure. And it is deſerving of notice, that, in general, the more ſuperficial the ſituation of the beds is, the lighter coloured the marble, and the more abundant the entrochi.

The purple veined marble is got at Ricklow dale near Moneyaſh. That with the blueiſh ground at the village itſelf. There is another variety at a ſmall diſtance from hence at a place called High low. It is known by the name of bird eye marble.

The black and grey marble agree in ſeveral properties. They are both calcareous, effervеſce with the mineral, and are corroded by the vegetable acids of the fermented and unfermented kind. I am informed, the ſpecific gravity of the black when compared with the grey is as

12 to 13, twelve cubical feet of the former; and thirteen of the latter weighing a ton.

Mr. Kirwan ſays, that black marble receives its colour from a ſlight mixture of iron. According to M. Bayen the grey contains a ſtill ſmaller proportion of this metal. Mr. Rinman obſerves, that the blue colour in marble, is owing to a mixture of ſhorl.

Calcareous Concretions.

Theſe are found in very great abundance in almoſt every part of the Peak. There is ſcarcely a ſingle cavern, which is not lined with encruſtations of this kind. The water being very much loaded with lime depoſits it upon all bodies and in all places, where it flows. Theſe concretions appear under all poſſible forms. The water-icles or ſtalactites are more eſpecially deſerving of notice. They moſtly contain a ſlight mixture of clay and iron, and from hence derive the variety of colour by which they are diſtinguiſhed.

Bright yellow ſtalactite—Matlock.

Dark brown ſtalactite of a cloſe texture, and receiving a high poliſh, from Winſter.

Stalactite of the ſame colour from Wirkſworth.

Round ſcaly ſtalactite (Piſolithus) from the Cumberland mine, Matlock.

Stellated ſtalactite—Caſtleton.

White ſtriated ſtalactite—Aſhover.

Green ſtalactite, very elegant, from a mine at Matlock.

Large pipes of ſtalactite from Poole's hole, Buxton.

A pipe of ſtalactite formed in a water pipe in a mine near Cromford. The wood was decayed and the water for a conſiderable time had paſſed thro' its ſelf-made calcareous trunk.

Stalactite of a light milky blue caſt, almoſt tranſparent, receiving a very high poliſh and rendered very beautiful by veins of a very dark brown colour ſpreading thro' it. This ſubſtance ſeems to be ſtalactite of a pure kind, and is found buried in the earth. When poliſhed its ſurface appears fat and oily. It ſeems to be the ſame calcareous concretion, which by M. de Fourcroy is called Alabaſter. From Bonſal.

Tophus.

This ſubſtance is formed in ſmall ſtreams of water by a ſlow and gradual depoſition of earth principally of the calcareous kind. It is alſo found in banks, which abound with gentle ſprings. At firſt it is very ſoft, but by being expoſed to the air, is rendered very hard and tho' porous becomes durable.

Tophus at Alport near Youlegrave formed in the courſe of a ſmall brook. It is ſometimes taken from thence and uſed in building. The chimnies at the top of many houſes in the neighbourhood are formed of this ſubſtance.

The entire bank next the river from the turnpike gate at Matlock to beyond the old bath is compoſed of Tophus, with which the new bath is built.

Tophus extremely beautiful reſembling honey comb within—Matlock.

Tophus ſtained with green & blue—Matlock. Theſe colours are found to be owing to a ſlight mixture of vitriol with iron and copper.

Calcareous encruſtations, and petrifactions of vegetable, animal, and teſtaceous ſubſtances are found in various parts of the county. But theſe I ſhall more particularly mention, when I come to enumerate the extraneous foſſils.

Tranſparent calcareous ſpars.

Profeſſour Bergman found the compoſition of calcareous ſpar to be ſuch, that 100 parts contain about 34 of fixed air, 11 of water and 55 of pure calcareous earth. Theſe ſpars ſeem to preſent an aſtoniſhing variety to the eye, but when examined I believe there is only one kind in Derbyſhire, the Rhombic, which by various combinations aſſumes extraordinary and beautiful forms. Mr. Bergman obſerves, that they conſiſt of a teſſera or oblique parallelopiped; all the planes of which are Rhombs of ſuch a kind, that the obtuſe angles are equal to $101\frac{1}{2}$ and the acute to $78\frac{1}{2}^{\circ}$ By a proper accumulation of ſuch ſimilar parallelograms cryſtals of the moſt oppoſite form may be produced.

Spar of an amber colour with 24 ſides from Eyam.

Brilliant tranſparent ſpar with 24 ſides from Eyam.

Doubly refracting ſpar (ſpathum iſlandicum) from Aſhover, and Braſſington.

Rhomboidal ſpar—Matlock.

Pyramidical or dog tooth ſpar—Matlock and Braſſington.

Diaphonous ſpar with 16 ſides from Eyam.

Hexagonal ſpar—Matlock.

Hexagonal priſmatic ſpar pointed with two pyramids—Calk.

Fluor ſpars, Blue John.

The fluors have for many years drawn the attention of the curious on account of the many ſingular properties, which they poſſeſs. The moſt uſeful of theſe is promoting the fuſion of ore. They contain an acid, the moſt penetrating we know of. It corrodes and perforates glaſs. The fluor principally conſiſts of lime ſaturated with this acid. Mr. Bergman ſays, that there is ſometimes preſent a little clay or flint. He ſometimes found alſo a ſmall portion of marine acid. From ſome ſpecimens collected in Derbyſhire the moſt elegant jointed ſiliceous tubes have been extracted. It melts of itſelf in a ſtrong heat, and the fumes which it emits are extremely noxious. When moderately heated it becomes phoſphoreſcent. The blue is ſaid to derive its colour moſtly from iron, but ſometimes from cobalt. The manufacturers of this article in Derbyſhire find, that they can change the blue into a red or reddiſh purple colour by expoſing it to a certain degree of heat. Fluor ſpar is compoſed of a great number of concentric lines or pyramids one applied above another. I ſhall now proceed to enumerate the fluors of Derbyſhire.

Purple with white veins, from Caſtleton.

Dark purple, from Caſtleton.

Nodules of purple and white fluor with concentric lines, from Caſtleton.

Purple fluor with concentric lines—Caſtleton.

Purple fluor with a layer of bright amber coloured fluor over it—Caſtleton. This is an elegant foſſil.

Fluor with a yellow caſt from a pit called Tanner's venture near Caſtleton.

Light purple and white fluor very beautiful called the Deakin ſtone at Caſtleton.

Pellucid fluor with a ſilver coloured pyritical vein running thro' it and following the angles of cryſtallization from Aſhover.

Yellow fluor—Crich and Aſhover.

Pellucid fluor—Crich.

Purple and yellow fluor—Crich

Purple fluor from Ball's eye mine near Cromford.

Fluor of an amethyſtine colour from Bonſal.

Brilliant tranſparent cubes of fluor upon lead ore from Wirkſworth.

Gypſum ſelenite or plaſter ſtone.

According to Mr. Kirwan 100 grains of gypſum contain about 30 of vitriolic acid, 32 of mere earth, (chiefly calcareous) and 38 of water of which it parts with about 20 by calcination. Mr. Morveau ſays its red colour is owing to iron. The greeniſh veins, with which it alſo abounds are found to contain ſulphur.

Pure and almoſt tranſparent gypſum at Chellaſton.

Gypſum nearly reſembling ſtatuary marble from Chellaſton.

White gypſum, and alſo with red and green veins ſpreading through it—Elvaſton. This is much harder and receives a higher poliſh than that, which is found at Chellaſton.

A piece of white gypſum without any degree of tranſparence found in ſinking a well at Darley turnpike, near Derby. Others of the ſame kind have been met with near Braſſington.

Fine columns of ſelenite found in a cavity of a piece of gypſum—Chellaſton.

The hair foſſil is a capillary gypſum. Specimens of it with the fibres above eight inches long have been found in the Cumberland mine near Matlock.

The ſnow foſſil, one of the moſt beautiful productions of nature, is a ramoſe gypſum. It alſo is found in the Cumberland mine.

Selenitical needles nearly two inches long found in the clay in Cumberland mine.

Small priſms of ſelenite cemented in one maſs with lead ore and other mineral ſubſtances, from a mine at Caſtleton.

Selenite conſiſting of Rhomboidal laminæ, from Caſtleton.

Fibrous gypſum commonly called Roche Plaſter, from Chellaſton. The ſtratum is from one to two inches thick, and lies in the clay a little above the ſolid bed of plaſterſtone.

Mr. Kirwan mentions having ſeen from Derbyſhire yellowiſh ſtone compounded of calcareous and barytical earth, conſiſting of lumps of chalk interſperſed with nodules of baroſelenite.

ARGILLACEOUS SUBSTANCES.

Porcelain clay of a moſt delicate white colour, and a very fine texture from a lead mine near Braſſington. Some years ago a ſmall quantity was uſed at the porcelain works in Derby. What is gotten at preſent is ſent to the potteries in Staffordſhire.

Pipe clay—Bolſover. It is not quite ſo good as that, which is procured from Pool in Dorſetſhire and the Iſle of Wight. However it may be manufactured very well with it. At Bolſover pipes are made with it in its native and unmixed ſtate.

Pipe clay near Newhaven. At the ſame place a very good potter's clay may be had.

A very good potter's clay from Crich.

Potter's clay at Brampton and Stanwich near Cheſterfield, Morley moor, Heage, Smalley and Horſley. They are chiefly of a yellowiſh or grey colour.

Potter's clay red and grey—Ticknall. The latter, as it corrodes the lead, is never uſed for the glazed ware.

Potter's clay—Grieſly green.

Indurated clay called bind, found in moſt of the coal pits. It is uſed for the improvement of land, the ſoil of which is light and ſandy.

Clay-ſtone is, as I have already obſerved, found in a great extent of country on the eaſt ſide of Derbyſhire. It runs eaſily into a ſlag, and this property has ſuggeſted an uſe of it, which has been pretty generally adopted in that part of the county, in which it appears. As proper materials for mending roads in ſuch ſituations are ſcarce, and coal is plentiful, ſlags which are eaſily procured from this kind of clay ſtone by burning it are often applied to this purpoſe. This method of procuring materials for repairing roads, on account of the ſmallneſs of the expence, perhaps might be adopted in other ſimilar places with advantage.

Terra tripolitana commonly known by the name of rotten ſtone is found near Bakewell. It is much uſed by the lapidaries in Derby for poliſhing.

Marl which is a compound of clay and calcareous earth may be obſerved in almoſt every part of Morleſton Hundred. But theſe two ſorts of earth are found mixed in exceedingly various proportions. Marl is alſo remarkable for its great diverſity of ſhade and hardneſs. It is of a grey, red, and light fleſh colour. But the ſecond is the moſt common. It is of two ſorts. One, which has the appearance of a thin ſhattery ſtone, contains but little calcareous earth, and when expoſed to the weather does not readily break and fall into pieces. However it is thought to be very uſeful when laid upon light or boggy land. But the other kind of red marl is much more valued. It is found to be a very efficacious and durable manure, eſpecially when it is mixed with a ſuitable proportion of dung.

Schiſtus tegularis roof ſlate—Chinley Hills near Chapel le frith, and Hayfield. It is of a grey colour and lamellar texture, ſhines with mica, and does not give fire with ſteel. It has been much uſed for covering of houſes in the neighbourhood. Some, which is of a more hard and compact texture, I am informed, has been carried to Buxton and employed for flooring in the Creſcent.

Brick clay in a variety of ſituations in the eaſtern and ſouthern parts of the county. The beſt, which I have ſeen, are met with in the neighbourhood of Derby, and the pariſh of Stapenhill.

SILICEOUS SUBSTANCES.

Thoſe ſubſtances, which come under this denomination, are found to ſtrike fire with ſteel, but do not effervеſce with acids. However

ever that which is obtained from fluor ſpar, as it has already been obſerved, acts upon, and corrodes it.

Siliceous like other primitive earths, is ſeldom found pure. According to Mr. Bergman its ſpecific gravity, when free from foreign matter is 1,975. Mr. Kirwan obſerves, that the particles when firſt precipitated, occupy in water at leaſt twelve times the ſpace, which they do when dried. So that when ſufficiently fine, they may remain ſuſpended therein, nay when vehemently heated in a cloſe veſſel they may be diſſolved. Fixed alkalies unite with ſiliceous earth in the liquid way. But in the dry way they ſeize it with great violence, and convert twice their weight of it into a permanent tranſparent glaſs. When pure it is refractory in the fire.

Quartz.

Theſe are the baſis of cryſtal. Beſides ſiliceous they contain ſometimes a very ſmall quantity of calcareous and argillaceous earth. They are more opake and leſs pure than cryſtals.

Solid ſmooth quartz from a mine oppoſite the high Tor, Matlock. I have heard of only one ſpecimen.

Small brilliant quartz cryſtal upon brown chert—Matlock.

Pale amethyſtine cryſtals found on the toadſtone—Matlock.

Pellucid cryſtals on the toadſtone—Matlock.

Hexagonal cryſtals terminated by two pyramids of the ſame form, found in a yellowiſh red earth near Buxton. They have a ſlight reddiſh tinge, which they moſt probably derive from a ſmall mixture of iron. Theſe cryſtals are commonly called Buxton diamonds.

Cryſtals of the ſame form, nearly an inch long, found in clay in a field between Mamtor and Caſtleton.

Small cryſtals of the ſame kind in an iron earth on Braſſington moor. Iron earth is the only bed, in which I have found perfect cryſtals.

Opake quartz or pebbles.

Quartz pebbles of good colour are ſometimes found in the neighbourhood of Derby. They take a fine poliſh, but are ſeldom free from flaws. For this reaſon they are neglected by the Lapidaries.

White quartoze pebbles found near Derby. When they are rubbed together, they emit ſtrong flaſhes of fire. In the furnace they run eaſily into a black glaſs.

Flint.

Flint.

Small pieces found in the gravel pits in the neighbourhood of Derby.

Large lumps in the gravel pits at Stenſon in the pariſh of Barrow. They are tolerably pure and almoſt tranſparent.

Petroſilex chert.

This ſubſtance is leſs hard and more opake than flint. According to Mr. Kirwan its ſpecific gravity is from 2. 59 to 2. 7. It is compoſed of ſiliceous united to argillaceous, and a ſmall quantity of calcareous earth. In fire it crackles and grows white like flint but is generally more fuſible, as it commonly melts of itſelf.

Chert is found in ſtrata, and may be ſeen in this form running thro' the rocks in various parts of the Peak. A large quantity of this ſubſtance is annually carried from the neighbourhood of Bakewell into Staffordſhire and Yorkſhire in which counties it is uſed for the manufacture of earthern ware. It is found in a thick ſtratum, but is not ſo hard as that, which is met with in many other places.

Chert of a hard rough and porous nature is found at Bonſall. It is called fiery dragon, and is made into millſtones.

White chert in the hill between Matlock and Bonſall.

Green chert—Matlock. It is found on the toadſtone.

Chert of the colour of a Cornelian ſtone found on the toadſtone near Matlock.

Brown chert—Middleton Dale.

Black chert—Matlock.

Dark green chert from a mine near the high tor, Matlock. It would be difficult to diſtinguiſh this from jaſper without breaking it. When broken it does not look quite ſo dull as jaſper.

White chert ſtriped with brown, found near Matlock. It takes a high poliſh and looks beautiful.

Angular pieces of chert cemented together by calcareous ſpar are found in Nether-Hay mine near Matlock. Theſe pieces of chert ſeem to have been left from ſome antient working of the mine, and to have been conglutinated together by the ſpar. It takes a fine poliſh, and is an elegant foſſil.

Breccia Silicia puddingſtones are found in the gravel pits near Derby, and are uſed for paving the ſtreets. In general they are of too dark colour to be beautiful.

Moorſtone compoſed of quartz and ſmall pebbles, or of quartz, felt-ſpar, and mica found in the north-weſt extremity of the county and on the eaſt moor. Millſtones are made of this ſtone on Kinderſcout in the pariſh of Gloſſop, and at Grindleford Bridge in the pariſh of Eyam.

Sandſtone or freeſtone is found at Bakewell Edge, Duffield, Matlock, Horſeley, Melbourn. The moſt elegant and magnificent houſes in Derbyſhire have been built with ſtone procured from ſome of the above places. At Melbourn and Horſeley ſcythe ſtones are manufactured from it.

Stone of this kind is found in laminæ at Dronfield, and in the pariſh of Gloſſop. It is a good deal uſed for covering of houſes in thoſe parts of the county.

A ſtone with a thin ſuperficial covering of a ſubſtance reſembling pumice ſtone found near Matlock.

Terra ponderoſa, Heavy Earth.

The ſubſtances, which come under this name ſeem not yet to be thoroughly underſtood, tho' they have been examined with conſiderable attention by ſeveral eminent chemiſts. They are found by analyſis as well as external appearance to differ ſomewhat from one another. The baſis of them all is the ſame, but this is diſcovered in union with various other principles: and according to theſe combinations, the heavy earth has been diſtinguiſhed by different names. Profeſſor Bergman, in his outlines of mineralogy has taken notice of two kinds, terra ponderoſa aerata, and terra ponderoſa vitriolata. A ſpecimen of the latter, which he examined, he found to contain in 100 parts 84 of heavy earth, 13 of the moſt concentrated vitriolic acid, and 3 of water.

But the ſubſtances, in which heavy earth is diſcovered, are not only compoſed of various conſtituent parts, but are alſo different in the external form and appearance. Mr. Fourcroy ſays, that heavy ſpar has been confounded with fluor ſpar by many naturaliſts, and that indeed it has the ſame fracture and does not effervеſce with acids. But its form, its ſmall degree of tranſparence, and above all its extreme weight are ſufficient to diſtinguiſh it. By one ſingle chemical character it may always be known. By pouring vitriol upon it no ſmell or vapour is produced. It is either cryſtalized, or in ſhapeleſs lumps, but always in beds more or leſs thick, and of different degree of extent. It is of conſiderable hardneſs, altho' it does not ſtrike fire with ſteel.

I proceed to give an account of the different ſubſtances containing heavy earth found in Derbyſhire.

Cauk, marmor metallicum of Cronſtedt, is found in large quantity in the lead mines throughout the county. Some ſpecimens of a white and of a reddiſh colour have been analized by Dr. Whitering. He ſays, they were cryſtalized in rhomboidal laminæ, but theſe very much inmixed and confuſed. Cauk of this kind loſes very little or nothing of its weight by being made red hot. Its ſpecific gravity is 4, 330. It appears from the experiments he made upon it, that 100 parts of Derbyſhire cauk contains 95, 5 of marmor metallicum, and 5 of calciform iron. Dr. Whitering thinks it probable, that the red pieces contain a little more iron.

The following varieties have been met with in this county:

Fleſh coloured cauk on the ſurface of the yellow fluor—Crich.

Dark brown cauk, which takes an exceedingly high poliſh from Aſhford on the water.

White cauk in ſprigs like heath on a brown ground (the fluor ericæformis of Da Coſta) from Bonſall Ley.

Ramoſe white cauk from Eyam.

Plated Cauk—Stoney Middleton.

Threaded cauk—Aſhford and Calke. This exactly reſembles balls of thread.

Stellated white cauk from Wirkſworth.

White cauk in ſpiculæ from Bogrod mine, Wirkſworth. Dr. Whittering has made ſome experiments and obſervations on a piece of terra ponderoſa vitriolata from Shropſhire apparently ſimilar to this ſpecimen. He ſays that it loſes little or nothing of its weight by being made red hot, that its ſpecific gravity is 4,000, but that after ſoaking one night in the water it was 4,200, or more. By analyſis 100 parts of it appeared to contain marmor metallicum 97, 7 calciform iron 2, 3.

The cauks of Derbyſhire have long been ſuppoſed by the miners of this county to be of a metallic nature. The ſame opinion was alſo entertained by Profeſſor Bergman. For he ſuppoſed the terra ponderoſa to be a metallic earth, though it had not been made into regulus. Dr. Whitering obſerves, that it ſeems to claim a place betwixt the earths and metallic calces. Like the former it cannot be made to aſſume a metallic form; but, like the latter, it may be precipitated from an acid by means of phlogiſticated alkali. In many of its properties it much reſembles the calx of lead and in others the common calcareous earth, but ſtill ſeems ſufficiently different to conſtitute a new genus, as will appear from a little attention to the following circumſtances.

Terra

Terra ponderoſa	*Terra calcarea*
When diſſolved in water precipitates upon the addition of the ſmalleſt portion of vitriolic acid Its gypſum therefore is inſoluble.	Diſſolved in water does not precipitate upon the addition of vitriolic acid Its gypſum therefore is ſoluble.
With the nitrous and marine acid forms cryſtals, which do not deliqueſce.	With nitrous & marine acids forms ſalts ſo deliqueſcent, that they cannot be kept in cryſtalized form
decompoſes vitriolic ſalts via lumida.	does not decompoſe vitriolic ſalts.

It has been called terra ponderoſa, or heavy earth upon account of its great ſpecific gravity of its gypſum; its ſpar is likewiſe heavy enough to countenance ſuch an appellation; but the earth itſelf does not appear to be a heavy ſubſtance, and I imagine the great weight of its compounds with the vitriolic and ærial acids is owing to the abſence of water.

INFLAMMABLE SUBSTANCES.

Inflammable air or fire damp comes with propriety under this claſs. Mr. Kirwan ſays, that this kind of air will flame, when it is mixed with two or three times its bulk of common atmoſpheric air. When pure, it explodes all at once, but when mixed or combined with fixed air it burns with a blue lambent flame.

Inflammable air is met with in moſt of the coal and ſome of the lead mines in Derbyſhire. In driving ſoughs likewiſe for relieving the mines from water, the workmen are generally troubled with it, more eſpecially when they paſs through beds of ſhale. Some years ago ſeveral perſons were killed by an exploſion of it in the famous Hilcar ſough near Youlegrave. Nor would it have been poſſible to have proceeded in the work without ſinking ſhafts from the ſurface at proper diſtances from each other, and by this means procuring a circulation of air thro' the ſubterraneous paſſage.

Sulphur.

Sulphur in a layer four inches thick found in the virgin mines Haſlebage near Bradwell.

Sulphur in a layer one inch thick in the toadſtone—Tideſwell moor. In both theſe inſtances it was found ſo pure, that it would flame with a candle.

Sulphur of nearly equal purity in Odin mine Caſtleton. It is alſo met with in ſhale in various parts of the county.

Pyrites.

Pyrites.

Pyrites is a combination of ſulphur with iron, arſenic, and vitriol. Their colour is owing to the mixture of ſome or all of theſe ſubſtances in different proportions. Iron mineralized by ſulphur gives a braſſy or golden colour. Iron mineralized by arſenic ſingly is of a bright white reſembling a mixture of ſilver and tin. The pyrites of Derbyſhire are in general exceedingly hard, and ſtrike fire with ſteel.

Pyrites without any determined figure, (pyrites ſulphureus rudis) from the Gregory mine, Aſhover.

Arſenical pyrites of a fine ſilver colour.—Eyam.

Pyrites which breaks like ſteel, (pyrites texturæ chalybeæ) Aſhover.

Pyrites in a bright ſilver-coloured vein running thro' pellucid fluor—Aſhover. The pyrites follows the angles of the cryſtalization of the fluor and is exceedingly beautiful. Pyrites of a golden colour ſprinkled over the ſurface of fluor. Aſhover.

Pyrites in exact cubes. Aſhover.

Pyrites glittering like gold on the ſurface of the Heanor coal.

Pyrites in the form of ſmall wedges on lead ore. Aſhover.

Pyrites in large braſſy wedges found in the cavities of Swanwick coal.

Pyrites jagged like the comb of a cock as bright as ſilver on ore of zinc. Eyam.

Greeniſh vitriolic pyrites found with the toadſtone one mile from Matlock by the ſide of the river Derwent.

Pyrites of a golden and a braſſy colour formed upon oval pieces of limeſtone. Theſe are found in a variety of lead mines and are commonly called Mundix in Derbyſhire.

Pyrites formed in a maſs reſembling a number of leaves lying upon one another. Ticknall.

It is impoſſible to enumerate all the pyrites of Derbyſhire. A great variety of them is found in almoſt every part of the county. They lie in a great meaſure neglected, though a large quantity of ſulphur might be extracted from them. The only uſe which is made of them, is obtaining copperas* from ſome, which are collected at Dore and Totley near Dronfield.

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* This Subſtance is found amongſt coal, and is generally known by the name of droſs. When it is brought to the work, it is laid in beds between two and three feet thick, and covering a ſpace of ground about ſixty yards ſquare. The pavement, upon which the pyrites lies, has a ſmall declination towards the middle where there is a channel formed to receive the liquor, and convey it into a large recevoir which is placed at the end. When the droſs has been expoſed a while to the weather a ſtrong acid, which has a whitiſh appearance, is ſeen on the outſide. This is waſhed off by rain and heavy dews, and runs down into the channel, and from thence into the ciſ-

It is to be hoped, that thoſe engaged in mineral concerns in Derbyſhire will grow more provident and attend to a matter, from which advantage may be derived to themſelves and their country.

Bitumen.

I place the Bitumens among the native foſſils, as moſt authors have done ſo, though they are thought by ſome to derive their origin from the animal and vegetable kingdoms.

Rock oil, (Petroleum) in veins of the black marble at Aſhford. It gently exudes, when the ſun ſhines upon the ſtone.

Hardened rock oil, (Pix montana or aſphaltum) found in Odin mine, Caſtleton.

Bitumen exceedingly elaſtic in a mine near Caſtleton. It takes fire on being touched with a candle and burns ſlowly with a very diſa-

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tern. The liquor is then pumped into a copper and the watery part is evaporated by boiling. This part of the proceſs generally requires five or ſix days. Before the evaporation is begun it is neceſſary to throw into the boiler a certain proportion of iron. Old nails or any ſcraps of this metal are found to ſerve the purpoſe. The duſt and ſmall pieces ariſing from the boring of cannon have lately been moſt uſed, becauſe they are eaſy of ſolution. In order to diſcover when the liquor is ſufficiently evaporated, it is cuſtomary to dip a ſmall ſtick in it and to drop it upon a piece of lead. If it cryſtallizes, it is time to ſtop the boiling. The liquor is then drawn off into a leaden cooler, from whence it is taken and put into caſks for ſale. Hamburg was the market, where it was formerly diſpoſed of, but now it is chiefly ſent to Hull and London. It is ſold at about five pounds ten ſhillings a ton. The quantity of copperas, which is made every year, is not great. It ſeldom exceeds a ton a week.

greeable ſulphureous ſmell. It is of a dark brown colour. I have not heard, that this kind is found in any other country.

Bitumen hard like aſphaltum found in the center of an anomia at Caſtleton.

Very hard ſolid Bitumen with a ſhining ſurface on tranſparent fluor. Aſhover.

Bitumen of this kind, at Darley bridge.

Liquid Petrol in a maſs of lead ore. Aſhover.

Stones containing a conſiderable quantity of rock oil were formerly met with near Stoney-Middleton. They were ſo common, that the miners uſed to burn the oil in lamps. There is not at preſent any work carried on at the place.

Small cavities in the black ſtone above the ſhale, containing a thick black oil, are found in various parts of the county.

Earth coal.

Mr. Kirwan ſays, that by diſtillation coal yields firſt fixed air, then an acid liquor, inflammable air, and a light oil of the nature of Petrol, then a volatile alkali, and laſtly denſe pitchy oil. The reſiduum is nearly ¾ of the whole, which is moſtly argillaceous earth. Mr. de Fourcroy ſays, that by the ſame proceſs he obtained alkalin phlegm, concrete volatile alkali, an oil of a deep colour which becomes more heavy as the diſtillation advances. He obſerves that at the ſame time there paſſes a great quantity of elaſtic and inflammable fluid, which is thought an oil in vapour, but may be an inflammable gaz of a particular kind, and that there remains in the retort a ſcorified coaly matter which is yet ſuſceptible of burning. This he adds is the coak of the Engliſh.

Coal, as I already have had occaſion to obſerve, is found in great abundance in Derbyſhire. Tho' various in its nature and properties, it may all be comprehended under the two general diviſions of ſoft and hard.

The ſoft coal, which lies much nearer to the ſurface, is found in moſt of thoſe ſhafts, in which the other ſort is met with. It is generally ſhattery, and often ſulphureous. It is much uſed for burning limeſtone, and the manufacture of iron goods. A large quantity is alſo converted into coak.

The hard coal, which is more uſeful and valuable, is more various in its nature and properties. I ſhall endeavour to diſtinguiſh it according to its different quality at the ſeveral places, in which it is found.

At Smalley, Weſt Hallam, and Ilkeſton the coal is of a ſhining and lamellar texture. It is not very heavy and ſolid. At firſt it blazes and burns very briſkly, but ſoon buries itſelf in a white aſh.

At Heanor and Shipley the hard coal is of a dull, ſcaly, compact, and ſolid texture. It takes fire with difficulty, and burns very ſlowly. But when once lighted, it diffuſes a lively and durable heat, and burns a long time before it is entirely conſumed. It is ſometimes attended with a ſtrong ſulphureous ſmell and yields a reddiſh brown aſh.

At Denby, Ripley, Swanwick and Alfreton, the hard coal partakes of the qualities of the two ſorts, which have been deſcribed. It is of a ſcaly, moderately compact, and rather bright texture. It burns with a ſtrong and regular heat, and laſts a conſiderable length of time. It is pretty free from ſulphur, and moſtly gives a white or grey coloured aſh.

At Normanton and Blackwell the hard coal agrees in moſt its properties with that, which is laſt mentioned. The chief circumſtance in which it differs, is, that it is harder and more refractory and therefore more apt to ſparkle and fly in the fire.

At Cheſterfield and Eckington the hard coal is but little ſulphureous and yields a large quantity of aſhes. That which is found at Newhall and Meaſham is very nearly of the ſame kind.

The coal near Buxton is ſhattery, and exceedingly ſulphureous.

Peat.

This ſubſtance according to Mr. Kirwan yields from diſtillation water, acid, oil, and volatile alkali, and its aſhes contain a ſmall proportion of fixed alkali. Theſe are either white or red according to the quantity of ochre or pyrites which they contain.

Peat is found throughout the north-weſt extremity of the Peak, and in moſt parts of the Eaſt Moor. When firſt dug up, its texture is ſoft, ſmooth and oily, but being cut into oblong pieces reſembling bricks, and expoſed to the influence of the ſun and air during the ſummer ſeaſon, it becomes brittle and inflammable and is in many places uſed for fuel.

Turf.

This ſubſtance generally covers the peat, tho' in ſome ſituations it is found alone. It conſiſts of a yellowiſh or browniſh bituminous earth interwoven with the roots of moſs, heath and other plants.

Both the above ſubſtances are poſſeſſed of a remarkably antiſeptic quality. Animal bodies may be preſerved in them for almoſt any length of time, tho' when taken out and expoſed to the air they ſoon periſh.

METALLIC SUBSTANCES.

From the account, which has been given of the ores and mines of Derbyſhire it will be eaſy to ſee, that the ſubſtances, which come under this claſs, muſt be various and abundant. But this will be rendered ſtill more evident by enumerating and deſcribing the natural and chemical characters, by which every individual ſubſtance of each particular ſpecies is diſtinguiſhed.

Lead ores.

A greater variety of lead ores has been found in Derbyſhire than perhaps in any other part of Europe in the ſame extent of country. The following liſt will give a tolerable idea of them.

Dr. Watſon obſerves, that lead ore is not always of the ſame goodneſs in the ſame mine nor even in the ſame part of the mine, and (what is more remarkable) the different parts of the ſame lump of ore have in equal bulks different weight. The weight of a cubic foot of the lighteſt, which he had met with, was 7051 ounces and the weight of a cubic foot of the heavieſt was 7786 ounces. This difference of weight, he thinks, is moſt probably owing to a diverſity in the ſize and configuration of the pores. Another obſervation made by Dr. Watſon upon lead ore, is that it contains lead and ſulphur, a liquid, and air. He ſays he has ſeparated inflammable air from it by diſſolving it in the acid of ſea ſalt.

Galena is found in many parts of Derbyſhire. Its figure, texture, and colour are various.

Solid maſſy lead ore—Aſhover.

Large cubes of lead ore (galena teſſulis majoribus micans) from Gregory mine, Aſhover. Some of theſe meaſure nearly two inches.

Large cubes of lead ore from the Bogrod mine near Wirkſworth.

Small cubes of lead ore (Galena teſſulis minoribus micans) from the ſame mine.

Cubic lead ore from a mine on the top of Maſſon hill, Matlock.

Lead ore in the black marble—Aſhford, and lead ore about the ſize of peas interſperſed throughout the toadſtone on Tideſwell moor.

Ramoſe lead ore from Dimple mine near Matlock Bridge. This ore ſhoots out into large branches, from which ſmaller ones proceed. It is rare and extremely beautiful.

Lead ore in large pyramids of the moſt lively colours, from Eyam. The beautiful tinge, with which this ore is covered, is aſcribed by ſome to a ſuperabundant quantity of phlogiſton. Others have thought that it is occaſioned by the vapour of the liver of ſulphur.

Lead ore in triangles from Eyam. This alſo is found coloured in the ſame manner with the laſt.

Steel grained lead ore, from Matlock, Youlegrave, and Eyam. Dr. Watſon obſerves, that the mean weight of a cubic foot of 6 pieces was 7342 ounces, and that this kind of ore is much richer than the ordinary diced ore of Derbyſhire.

Antimoniated lead ore—Eyam and Aſhover. This kind of ore appears maſſy on the outſide, but its fracture ſhews needles flat and ſhining like thoſe of antimony.

A large maſs of lead ore partly ſolid, and partly antimoniated with ſeveral veins of Petroleum running thro' it was found in the Gregory mine Aſhover. Part of this rare and valuable foſſil is in the collection of Sir Walter Synnot of the kingdom of Ireland. The remainder is in the poſſeſſion of Philip Raſleigh, Eſq; in Cornwall.

A large lump of lead ore mixed with coal found at the works at Denby.

Brown ſandy lead ore in the gravel pits at Normanton near Aſhborne. It melts of itſelf with a gentle heat.

Brown lead ore. Matlock.

Potter's lead ore. Eyam.

Semi tranſparent white lead ore, the ſpatum plumbi of Cronſtedt, Hubbadale mine near Bakewell. According to M. de Fourcroy white ſparry ore is the calx of lead depoſited ſlowly by water and cryſtalized. He ſays its cryſtals are uſually in mutilated hexædral priſms, or in-ſtriated cylindrical columns. M. Laborie has aſſured us, that white lead is nothing but a pure white earth of lead united to fixed air, and cryſtalized by water. In confirmation of this opinion M. Romé de l'iſle has remarked, that it is not uncommon to find galena, which is beginning to paſs into the ſtate of white lead.

Sparry lead ore, Winſter and Eyam. Mr. Longſdon of Eyam has a noble ſpecimen of this curious and valuable kind of lead ore.

Friable white lead ochre, native ceruſſe, from Raven-tor mine near Wirkſworth. Friable brown lead ochre from the ſame mine.

Indurated calciform lead ore of a pure white colour from Middleton near Wirkſworth. Indurated calciform brown lead ore from the ſame place.

Maſſes of lead have been found in the earth, detached from any vein, near Wirkſworth. Theſe pieces are of very extraordinary form. By ſome it is imagined, that they have been torn by great violence from their native beds. But it appears more probable, that they were produced and left by the working of ſome antient mine, when it was cuſtomary to procure the lead from the ore by ſetting fire to the veins, in which it was found.

Copper ore.

The copper ores of Derbyſhire are not remarkable for their number or variety.

Liver-coloured copper ore of a ſolid texture, from a mine at the end of Lovers walk, Matlock.

Very dark brown copper ore, Ruſſop edge near Chapel le frith.

Green ſattin copper ore from a mine on the edge of the river Derwent, Matlock. This colour is ſaid to be occaſioned by the marine acid.

Lumps of copper ore have been found in various other parts of the county. But hitherto they may be conſidered rather as an object of curioſity than value

Iron ore, or ſtone.

The texture and colour of the iron ores of Derbyſhire are various. The moſt common are thoſe of an argillaceous kind. There are however a few others of a different ſort, of which it may be proper to take ſome notice.

Red ironſtone. Heage and Holmesfield.

Light grey ironſtone. Cheſterfield and Wingerworth.

Dark brown ironſtone—Wingerworth and Cheſterfield. At the latter place it has ſometimes veins of pure white clay running thro' it.

Ironſtone at Cheſterfield, which being expoſed to the air falls to pieces and diſcovers ſomething white like ſpar. Mr. Bergman found, that white ore of iron contains 38 parts of calcined iron, 14 of manganeſe, and 38 of ærated lime.

Striated iron ore, minera ferri griſea ſtriata, is found near Bonſal. This texture ſeems to be produced by antimony.

Stellated iron ore. Bonſal and Swanwick.

Cavernous ironſtone is found over moſt of the lead mines at Wirkſworth. It is called toft by the miners, and lies totally neglected.

The toadſtone found at Matlock is exceedingly rich in iron. Much poorer matters are worked for that metal.

Ponderous nodules of dark red ironſtone are found between Higham and Shirland. They are vulgarly called loadſtones.

Sandſtone is found near Belper with ſpots larger than a pea all through it of a rich iron ſand. Theſe particles ſeem to have been brought together by attraction, as there is no appearance of iron in any other part of the ſtone.

Ferruginous Geodes are found in the banks, about Littleover.

Ironſtone boulders are found in the bind, over the coal pits, at Swanwick and Ilkeſton. But of theſe I ſhall take more particular notice under the head of extraneous foſſils,

A ſtratum of a ſubſtance called cank is found in ſinking ſhafts for coal at Alfreton, Ilkeſton, and Newhall. It is ſaid to contain iron, but I believe, is never ſmelted with a view of obtaining this metal from it. It is ſo very hard, that in boring for coal they cannot paſs thro' it without extreme difficulty.

Bloodſtones or Hæmatites are found at Derby, Spondon, Sandiacre, and Hartington. I believe, they may be alſo met with in all thoſe parts of the county, in which red clay and marl appear on the ſurface of the ground. Some valuable ones have been picked up and diſpoſed of at Birmingham, where they are uſed for burniſhing goods plated with gold. The beſt are ſaid to be found in a bed of ſandy red clay.

Ochres.

Martial ochres (ferri terra precepitata non mineraliſata) are more abundant in nature, than any other kind of iron ore. They are ſuppoſed to reſult from the decompoſition of ores of iron, which is produced by water, but more eſpecially by fixed air. The acid of this air, with which the moiſture, that circulates thro' the earth, is impregnated, gradually takes away the phlogiſton from the iron, and reduces it into the ſtate of calx.—Martial ochre is owing to the ore of ſulphureous iron, and is found in moſt parts of Derbyſhire. The beſt, of which I have any knowledge, is of a rich yellow colour and is met with in a cavern called the Water hull near Caſtleton.

Pale yellow ochre, from a mine near Winſter. This kind of ochre may be obſerved in many ſoughs, belonging to the coal pits, and is the moſt abundant, when the coal contains much ſulphur.

Dark brown ochre from the lead mine under the high Tor, Matlock.

Yellow ochre from moſt of the chalybeate ſprings.

Balls of yellow ochre, found in the ſhale at Haſſop.

Theſe colours deſerve the attention of our moſt eminent painters, as they are ſaid to be the moſt durable pigments in nature.

In Derbyſhire the earth is in many places very rich in iron. Some on Braſſington moor has been worked with a view of obtaining this metal from it.

In the neighbourhood of Buxton and Chelmorton there is an earth lying near the ſurface of the colour of a fox, and known in that part of the country by the name of fox earth. Tho' it has not been particularly examined, I ſuſpect it contains a conſiderable quantity of iron. In this earth the Buxton diamonds are found, and it is in its nature ſo exceedingly barren, that it is ſcarcely improveable with manure. On this account the farmers with all poſſible care avoid turning up and mixing it with the common ſoil.

Near the coal pits at Denby, Smalley, and Heanor, is found a clay ſometimes coloured ſuperficially by a dilute blue, and ſometimes when newly dug up it is obſerved to acquire this colour upon expoſure to the air. According to ſome experiments made by Dr. Whitering upon a clay apparently ſimilar, the baſis of this colour is an irony matter full of phlogiſton; for by ignition upon a charcoal fire it flames, turns red, and becomes magnetic.

SEMI-METALS.

Calamine, minera zinci terrea.

Profeſſor Bergman found, that there are, in 100 parts of Hungarian lapis calaminaris, 84 of calcined zinc, 3 of calcined iron, about 1 of pure clay, and 12 of ſilicious earth. It cannot be expected, that this proportion ſhould hold good in common ſpecimens. However Mr. Kirwan obſerves, that a good ore ſhould yield at leaſt 30 per cent. and its ſpecific gravity be about 4,400 or 5,000.

Native zinc in greyiſh, thin, flat, pliant, and inflammable needles found in the cavity of a piece of brown lapis calaminaris at Bonſal. This ſpecimen is in the poſſeſſion of Mr. Bourn of Eaſtwood in Nottinghamſhire.

Zinc cryſtalized, on the outſide, in ſeveral wedges like cryſtals, from a mine near the high Tor, Matlock.

Cryſtals of zinc, tranſparent, of a garnet colour, from a mine near Aſhover.

Plain ſolid calamine. Bonſall.

Bone calamine, extremely cavernous, from Maſſon hill near Matlock. This ſpecies of ore is furrowed, and cellular, and appears, as if it was worm-eaten.

Calamine in the form of dog tooth ſpar. Matlock. In this caſe, and in all regular forms the calamine ſeems to have been depoſited on a ſpar, which it has deſtroyed, and aſſumed the figure of. For I believe, that calamine has never been known to cryſtalize.

Rhombic calamine found near Winſter. This has taken its form from rhombic ſpar.

Waxen calamine found at Matlock. It is very cavernous, and exactly of the colour of bees wax.

Waxen calamine, from a mine near Matlock, formed upon a perfect ſpar, pointed at both ends.

Nodules of white calamine, from a mine near Bonſal.

Stalactitical calamine, very ponderous, found near Bonſal.

Stalactitical calamine found near Matlock.

Calamine, coated over points of ſpar, which it had half deſtroyed, from Eyam.

Zinc mineralized by ſulphur and iron, pſeudogalena of Cronſtedt, is known in Derbyſhire by the name of mock ore, and has ſo great a reſemblance to lead ore, as to be frequently miſtaken for it. Theſe ores of Zinc are of various colour, and extremely refractory in the fire. At preſent they are not at all uſed for converting copper into braſs. As they are found in abundance, it is a pity, they ſhould be ſo entirely neglected. The Germans know very well how to ſmelt ores of this ſpecies, and draw very conſiderable profits from them.

Black pſeudogalena, called by the Derbyſhire miners black jack, from a mine near Wirkſworth. Profeſſor Bergman ſays, that upon a juſt calculation this variety contains in 100 parts 29 of ſulphur, 1 of regulus of arſenic, 6 of water, 6 of lead, 9 of iron, 45 of zinc, and 4 of ſiliceous earth.

Brown pſeudogalena, Eyam. According to P. Bergman, ore of this colour contains in 100 parts, about 17 of ſulphur, 5 of water, 44 of zinc, 5 of iron, 5 of clay, and 24 of quartz. He thinks it is probable, that the zinc is more dephlogiſticated in this than in the other inſtances.

Pſeudogalena poſſeſſing a metallic ſplendor, at Cromford. From Dr. Bergman's analyſis of this kind of ore it appears, that 100 parts contain 52 of zinc, 8 of iron, 4 of copper, 26 of ſulphur and 4 of water, together with 6 of a ſiliceous and martial matter.

Black wad.

Mr. Wedgewood found by analyſis, that 22 parts of this mineral contain nearly 2 of indiſſoluble earth, chiefly micaceous, 1 of lead, about $9\frac{1}{2}$ of iron, and the ſame quantity of mangaueſe. It is of a dark brown or blackiſh colour, and is met with in different ſtates. It is ſometimes found in the form of a powder but its moſt uſual appearance is that of a brittle hardened clay. The late Mr. Roe, painter of Derby, above thirty years ago diſcovered, that by mixing it with linſeed oil, firſt a heat and afterwards a flame would be produced.

Black-wad has been found to be very uſeful as an oil colour in houſe, and ſhip painting. It is chiefly employed for the latter purpoſe, and the principal demand has been for the royal navy. This uſe of black-wad, I believe, was firſt found out by Mr. Dawſon of Winſter. He made it known to Lord Sandwich, when firſt lord of the admiralty, and has derived conſiderable advantage from his diſcovery.

Black-wad is chiefly found at Elton near Winſter. It is generally calcined, before it is uſed. There is a work for this purpoſe at

Wenſley, a village a few miles diſtant from the place, where it is found.

I have been informed, that ſome years ago black-wad was met with at Parwich.

I am not ſufficiently acquainted with the nature of the following mineral ſubſtances, to be able to arrange them properly under any of the foregoing claſſes. I ſhall therefore ſubjoin a ſeparate account of them in this place.

Slickenſides.

Slickenſides with one poliſhed ſurface, from Lady-waſh mine near Eyam, and from Gregory mine at Aſhover.

Slickenſide with a ſmooth ſurface on each ſide, from Haycliff mine Eyam, and Aſhover.

The crackling and exploſions cauſed by ſcraping theſe ſlickenſides with a pick-ax are well known, but hitherto not ſatisfactorily accounted for. They are ſaid to loſe the above property very ſoon after they are taken out of the mine. In regard to their external appearance, their ſmooth ſide greatly reſembles black lead very thinly ſpread over the ſurface of any ſmooth body. But the rough ſide looks very much like to common limeſtone.

Zeolites in the form of wedges have been lately found in a vein on Hopton Moor. Theſe have not been ſufficiently examined, and the above ſpecimen I have not had an opportunity of ſeeing.

Carpolithi of a white ground ſpotted with green of a lively colour. The baſis is cauk, the green part is an indurated pyritical earth. They were found at ———.

SECTION II.

Extraneous Foſſils.

HAVING thus given a general idea of the native foſſils of Derbyſhire, which have either fallen under my inſpection, or come to my knowledge, I now proceed to deſcribe the extraneous ones. Theſe are extremely worthy of notice on account of both their amazing number and variety. They occur in almoſt every part of the county. The mountains of limeſtone, which extend thro' the high and low Peak, ſeem to be compoſed of marine productions. Entrochi, a ſpecies of ſtar fiſh, are found almoſt every where. I have ſeen continued beds of them, above twenty miles in length. The number of Anomiæ is prodigious,

gious. Had Ovid viſited here the ruins of a deſtroyed world, he might have juſtly ſaid,

> ———— Vidi factas ex æquore terras
> et procul a pelago conchæ jacuere marinæ.

Corraloids.

The cone in cone corraloid is found, in a bed ten inches deep, on the ſurface of the ſhell marble at Tupton near Wingerworth. The cones are exceedingly diſtinct. No finer or more perfect foſſil of this kind has been found any where.

A fine ſpecimen of cone within cone corraloid, found at Blackwell.

Another of the ſame kind, found in ſinking a ſhaft for a fire engine at Aldercar in the pariſh of Heanor. It was met with at the depth of 47 feet.

Corraloids, with ſmall tubes, from Eyam. The recent coral of this kind is found in the red ſea. It is known by the name of tubularea purpurea. This foſſil perfectly agrees with it in every particular.

Pori fungitæ from Stoney Middleton. The ſpecimens very perfect.

Madrepores, coral, branched, with ſtars at the extremity of each branch. A ſpecimen with angular branches from Matlock.

Madrepores with round branches from Eyam. Theſe are Madreporæ ramoſæ ramis rotundis of Imperatus.

Millepores, coral, branched, with the ſurface and extremity punctured, as if pierced with the point of a needle, from Middletondale and Bonſal.

Tubipores, a congeries of coralline tubes parallel, or variouſly curved, from Middleton dale.

Fungitæ, from Hopton moor.

Conic fungitæ, from Aſhover.

Aſtroites, coral, of tubular texture, with ſmall ſtars on the ſurface, and honeycomb-work within ſide, from Aſhford.

Porpites, from Eyam.

Retepores, from Caſtleton.

The ſea fan (Corrallina reticulata) from Caſtleton.

Plates of Echini very curiouſly formed, the plates pentagonal with a ſmall point riſing in the middle, from Caſtleton.

Spines of Echini from Caſtleton.

Entrochus, cylindrical, ſometimes three inches, generally about one inch long, compoſed of ſeveral flat round joints with radii on each diſh and perforated thro' the middle, from Caſtleton, Moneyaſh Moor, Matlock, Dove-dale and Wirkſworth.

Trochites from Bonſal Ley.

Oval Trochites from the ſame place.

Screw ſtones, very elegant, from Aſhover. Theſe are parts of ſtar fiſh.

Screw ſtones in chert. Matlock.

Ammonites, Cornu Ammonis or Nautilus, ſerpent-ſtone, flat, ſpiral, repreſenting a worm or ſmall ſerpent coiled up, ridged and ſtudded, in the black marble. Aſhford.

Belemnites, cylindrical, but conical at one and ſometimes at both ends, generally about the length and thickneſs of a finger, with a conical cavity at the baſe. Caſtleton.

Jointed belemnites in the black marble. Aſhford.

Anomiæ, bivalve, one valve gibbous, and often perforated at the baſe, the other plane, and leſs, the hinge without tooth, from Caſtleton, Dovedale, and Matlock.

Large anomiæ from Crich.

Large bumped anomiæ from Matlock.

Gryphites, bivalve, oblong, ſomewhat reſembling a boat, but narrow and remarkably curved upwards at one end, the valve plane, found in the red clay over the Gypſum. Chelaſton.

Terrebratulæ, from Caſtleton.

Oſtreopectines, from Caſtleton.

Buccinites, from Caſtleton.

Tellinae, from Aſhover and Hartington.

Siliceous petrified wood is found in the gravel pits near Derby. A fine piece was a few years ago taken out of the pavement of the town of Derby.

Petrified ruſhes found near Matlock.

Yew in the ſame ſtate. Matlock.

A petrified ſubſtance greatly reſembling a cauliflower. Matlock.

Muſcle ſhells in ironſtone, in the marble at Tupton, near Wingerworth.

Muſcle ſhells in the ironſtone. Cheſterfield.

A regular ſtratum of muſcle ſhells found eleven yards deep at Swanwick.

Muſcle ſhells in ironſtone 84 yards deep at Cotmenhay in the pariſh of Ilkeſton.

Animals and inſects.

A ſmall alligator in the black marble at Aſhford.

The tail and back of a crocodile are ſaid to have been found at Aſhford, and to be preſerved in a cabinet at Bruſſels.

Groups of flies in the black marble, Aſhford.

A beetle in ironſtone, Swanwick.

A butterfly, from Swanwick.

Vegetable-impreſſions.

An entire ſunflower, with all the ſeeds perfectly marked, found in an ironſtone over the bed of coal at Swanwick. This rare foſſil is in the poſſeſſion of Mr. Tatlow of Swanwick.

A reſemblance of a bamboo from Swanwick.

A flower of chryſanthemum very perfect from Swanwick.

A flower of coltsfoot from Swanwick.

Several kinds of fern very perfect in ironſtone from Swanwick.

Equiſetum or horſetail very perfect. Swanwick.

A plant of maiden hair from Swanwick.

Several plants of fern in bind from Swanwick.

A ſmall branched moſs in ironſtone. Swanwick.

The cone of a pine tree, in ironſtone. Swanwick.

The branch of a box tree, in ironſtone. Swanwick.

A reſemblance of the flower of a cactus. Holmesfield.

Moſt of theſe foſſils are in the collection of Mr. Tatlow. Beſides thoſe I have now enumerated, he has ſeveral other with vegetable impreſſions upon them. But as the plants are ſuppoſed not to be Britiſh, it is only a ſkilful botaniſt, who can give them their proper names. The ironſtone and bind at Cheſterfield and Newhall likewiſe abound with vegetable impreſſions, many of which are the ſame with thoſe, which have been mentioned. Indeed there are very few beds of ironſtone in Derbyſhire, in which they do not in ſome meaſure appear.

I mean not to offer the above as a complete catalogue of the Derbyſhire foſſils. It is impoſſible it ſhould be ſo in a country, in which new mines are opened every day. The principal merit, which it has to recommend it to the curious enquirer, is, that it is an authentic liſt, not copied from the works of other writers. Many of the ſpecimens mentioned have come under my own inſpection, chiefly in the collection of a gentleman, who reſided four years in this county for the purpoſe of examining its mines and foſſil productions.

If what I have written in this chapter is of uſe to the curious foſſiliſt, the principal end for which I have deſigned it, will be anſwered. My ſatisfaction will however be much encreaſed, if it tends in any meaſure to promote the ſtudy of this branch of ſcience. What more elegant amuſement can offer itſelf to the man of leiſure and of fortune? What that can raiſe the mind more to the admiration of the great creator? What that can be more beneficial to the arts and manufactures of our country? Surely thoſe, who are bleſſed with affluence, cannot conſider theſe as uſeleſs and ignoble purſuits.

The character of a mere collector of foſſils has been with ſome juſtice derided. But even perſons of this deſcription are not entirely uſeleſs to ſcience. In their muſeums the ſkilful mineralogiſt often meets with bodies, by which he extends his knowledge. The matters amaſſed by them at length fall into the poſſeſſion of the experienced chemiſt and philoſopher, who knows in what manner to benefit ſociety by them. None but the ignorant and illiberal can condemn thoſe, who devote their time to uſeful diſcoveries. It will admit of a doubt whether any claſs of men be more ſerviceable to their country, excepting thoſe, who improve its agriculture and manufactures.

Perhaps it may be expected, that I ſhould have entered more deeply into the ſubterranean geography of Derbyſhire, or at leaſt have more particularly applied the obſervations, which have been made, to the illuſtration of this part of natural hiſtory. But too few lights have yet been thrown upon the ſubject to enable me to do it in the ſatisfactory manner I could wiſh. Men are apt to make inductions from a certain number of remarks formed in ſome particular diſtricts; a method of proceeding which muſt be extremely prejudicial to real knowledge. As this is frequently the caſe, it is much to be wiſhed, that thoſe, who reſide in mineral countries would keep accurate liſts of the ſtrata, veins, their particular directions, and dippings, &c. &c. From a collection of ſuch remarks, judiciouſly formed, greater advantage would be derived, than from all the theories, which have been ſuggeſted by the imaginations of fanciful men. The earth has undergone ſuch various changes ſince its formation, the original beds have ſuffered ſo great alteration both from water and fire, that we can ſcarcely hope, that any perfect ſyſtem ſhould ever be eſtabliſhed. If man, with all his reaſon and ſtudy, cannot thoroughly underſtand the laws of attraction, by which a ſingle cryſtalization is formed, how can he expect to comprehend thoſe, by which the almighty thought fit to create and govern the world? His works far ſurpaſs our feeble ideas, and we may with propriety ſay with that excellent naturaliſt

Bertrand, " Reconnoiſſons qu'il faut toujours remonter et ſouvent s'arreter à la ſyſtematique de l'univers ſagement formé par le createur infiniment puiſſant. C'eſt la premiere cauſe et la derniere raiſon de tout."

CHAP. VI.

Medicinal waters and baths.

THE analyſis of mineral and medicinal waters is a buſineſs, which for ſome years paſt has engaged the attention of the moſt eminent chemiſts in Europe. Profeſſor Bergman at Upſal in Saxony, M. Monet, M. Duchanoy, and M. de Fourcroy in France, and Drs. Faulconer, Percival, and Pearſon in our own country, have each diſtinguiſhed themſelves by the diſcoveries and improvements, which they have made in this branch of knowledge. However, tho' conſiderable light has been thrown upon the ſubject by their ingenious labours, the analyſis of mineral waters is not yet arrived at that degree of preciſion, to which it may perhaps be ſome day carried.

Many circumſtances and qualifications are requiſite for a ſucceſsful proſecution of ſuch an undertaking. Whoever attempts this difficult part of chemiſtry ſhould have a correct knowledge of the ingredients uſually contained in theſe waters, be perfectly acquainted with all chemical phænomena, and exerciſe peculiar addreſs, in order to perform the operation with ſufficient accuracy. He ſhould alſo attend to the ſituation of the ſpring, and nature of the ſoil. The natural as well as chemical properties of the water ſhould likewiſe be examined; its taſte, ſmell, colour, weight, tranſparence, and temperature. When I conſider the indiſpenſible neceſſity of all theſe qualifications and circumſtances, I ſhould not attempt to give an account of the mineral, medicinal waters of Derbyſhire, had I not received conſiderable aſſiſtance in the execution of ſuch a deſign. I have not only availed myſelf of the experiments and obſervations, which have already been made, on the moſt renowned ſprings in the county, but have been favoured with other no leſs valuable communications reſpecting them, which I am furniſhed with an opportunity of laying before the public.

The diſcovery, which has lately been made of the ingredients contained in mineral waters, has raiſed in the minds of ſome perſons a doubt concerning their real efficacy and uſefulneſs. Perhaps in ſome inſtances they may have been extolled above their juſt deſert. But it is an unqueſtionable fact, that they daily give relief in many caſes, and in others entirely remove the diſorders, for which they are recommended. Beſides, the cauſe would not appear ſo inadequate to the effect produced, if a proper degree of attention was paid to the ſeveral ſubſtances, with which mineral waters are impregnated. The fixed air, which they generally contain, is known, when adminiſtered alone, in many caſes to have a very powerful and ſalutary influence. Nor are the ſaline matters, which are found in them, leſs efficacious and uſeful. M. de Fourcroy obſerves, that the ſtrong taſte and extreme diſſolubility of calcareous marine ſalt, and marine ſalt of magneſia ſhew, that they ought to have a great deal of power on the ſolids and fluids of the human body. He adds, it is owing to this mixture, that common ſalt has an irritating action, is ſharp and purgative, and has greater energy than refined ſalt.

The great utility of mineral waters will be ſtill more eaſily conceived and admitted, if it be conſidered, that they require much time to produce their full effect. In ſome caſes a large quantity of the fluid muſt be drank, before any benefit can be received from them. It is well known, that ſucceſs often attends the ſimpleſt remedies, when they are employed with patience and perſeverance. And mineral waters may be juſtly ranked among theſe remedies of ſlow operation. Conſidering them in this light Profeſſor Bergman obſerves, they effect ſurprizing cures every day and ſuch as could not be expected from any other mode of cure hitherto diſcovered. We are not to attribute theſe effects to ſimple water conſidered by itſelf, for according to this ſuppoſition they would be produced in every place alike, but to the ſubſtances mixed with it and diſſolved in it, by which it is ſharpened, and as it were armed with ſuch efficacy.

I hope, that by means of the obſervations, which are made in the following pages, on the mineral waters of Derbyſhire, their nature will be better underſtood. They may alſo tend to throw light upon thoſe, which are found in other ſituations, and which upon examination appear to contain the ſame ſubſtances. For the effects produced by one may be expected to ariſe from a uſe of the other.. Or on the contrary ſhould it be diſcovered, that by analyſis they reſemble any other mineral waters in their ingredients, it may be known from an attention to the diſorders, for which theſe are recommended, in what caſes thoſe of Derbyſhire may be uſed with advantage.

In a country abounding with foſſils the waters naturally muſt contain in ſolution earthy, ſaline, and metallic ſubſtances. It may therefore be expected, that in Derbyſhire mineral waters will be met with in great number and variety. I profeſs not to enumerate and examine them all. To do this, would be almoſt an endleſs taſk. On this account I mean to confine the obſervations, I ſhall make, to a few of the moſt remarkable.

In treating on medicinal waters moſt writers have formed them into claſſes. But the diverſity, which appears in their arrangements, plainly ſhews, that ſuch diſtinctions are in a great meaſure arbitrary, tho' perhaps not entirely uſeleſs. I ſhall not therefore be ſolicitous about the accuracy and preciſion of the order, in which I ſhall place the mineral, medicinal waters of Derbyſhire. My leading aim will be to diſpoſe of them in ſuch a manner, as ſhall appear calculated to give the moſt clear and diſtinct idea of their impregnation and uſes.

It may be deſerving of notice, that all the mineral waters of Derbyſhire of a chalybeate and ſulphureous nature, where I have had an opportunity of examining their ſituation, ariſe in beds of ſhale. And from this circumſtance it ſeems probable, that they derive their impregnation from this ſubſtance. Such a conjecture is ſtrengthened by obſerving, that, in dry ſeaſons, ſeveral of the ſprings become weaker. This is remarkably the caſe in regard to the martial vitriol water at Heage. The degree of its ſtrength is entirely determined by the ſtate of the weather. I am credibly informed, that, when there has been no rain during ſome months, the vitriolic taſte by which it is diſtinguiſhed, has been ſcarcely perceptible. As there is no moiſture in the ground to diſſolve the ſubſtance, from which the water derives its impregnation, the well is ſupplied with that only, which diſtills from other parts of the earth in its neighbourhood.

In reſpect to the warm ſprings, it is alſo obſervable, that they appear at the ſurface near theſe beds of ſhale. Though they break out in the ſtratum of limeſtone, yet they are found only in thoſe parts of the county near which it ceaſes to appear. Buxton, Matlock and Stoney Middleton all lie upon the borders of that extenſive tract of limeſtone, which appears on the north-weſt ſide of Derbyſhire. I mean not to infer from this ſituation of the warm ſprings, that they receive their impregnation from ſhale. I have only taken notice of it, as this circumſtance may poſſibly lead to diſcoveries reſpecting the origin of theſe warm waters.

Medicinal ſprings and baths at Buxton.

Theſe are entitled to a very particular and diſtinguiſhed notice on account of both their very antient reputation and great uſefulneſs. It will ſcarcely admit of a doubt, that Buxton on account of its warm ſprings was frequented by the Romans at the time, when they were in poſſeſſion of this country. In Camden's Britannia notice is taken of a Roman wall cemented with red Roman plaiſter cloſe by St. Anne's well, near which were the ruins of an antient bath. And in the year 1781, when the foundations of the Creſcent were dug, the ſhape and dimenſions of this bath might be very clearly diſcerned. Its form appeared to be an oblong ſquare, or parallelogram. It meaſured from eaſt to weſt thirty feet, and fifteen in the contrary direction. The ſpring was ſituated at the weſt end, and at the eaſt might be plainly perceived a flood gate, by means of which the water was let out. The wall was built with limeſtone and appeared to be of rude workmanſhip. On the outſide it was covered with a ſtrong cement, which moſt probably was deſigned to prevent the cold water from mixing with the hot. The floor was formed with plaiſter and appeared not to have ſuffered any material injury from time. On the top of the walls were laid ſtrong oak beams, which were firmly connected together at the four corners. For theſe particulars I am indebted to the late Dr. Bullock, who from every appearance of the place thought it very probable, that the bath was expoſed to the open air.

Sir Thomas Delves of Cheſhire, who cauſed an arch to be erected near this place in memory of a cure, which he had received at Buxton, is ſaid to have diſcovered very capacious leaden ciſterns, and a variety of other utenſils, which evidently appeared to be of Roman workmanſhip.

Another circumſtance, which adds weight to the foregoing obſervations, is, that a very antient road has been traced between this place, and Brough near Caſtleton, where the Romans undoubtedly had a ſtation. This road is now called Bathomgate, a name, which it has received at a later period, and which Mr. Pegge has ſhewn to be of Saxon derivation.

It is reaſonable to ſuppoſe, that the warm medicinal waters at Buxton were never entirely forſaken from the time, of which I am ſpeaking, to the preſent day. However we have no certain evidence, that they were in any high degree of reputation, till the beginning of the ſixteenth century. Dr. Jones, who in 1572 publiſhed obſervations on the benefit of the Buxton baths, ſays, that contiguous to the main ſpring, and betwixt the river and bath, there was a goodly houſe. But it is intimated by Mr. Lambarde, (a cotemporary writer) that the efficacy of Buxton water was more aſcribed to the miraculous power of St. Ann, the patroneſs of the place, than to any medicinal virtue, of which it was ſuppoſed to be poſſeſſed.

Tho' Buxton was very much frequented in the reign of queen Elizabeth, the number of thoſe, who have reſorted thither ſince that time, has been continually encreaſing. Houſes for their reception and accommodation have alſo, as might be ſuppoſed, been multiplied in the ſame proportion. The hall, which is the moſt antient building has been erected at different periods. The oldeſt part was raiſed above 200 years ago. In the reign of Charles I. an addition was made to it by George Talbot Earl of Shrewſbury. But the largeſt part was not built till nearly the middle of the preſent century. Beſides the hall there are in the village ſeveral other houſes deſigned for the ſame purpoſe. But none of them are equal to it in ſize or convenience of ſituation. However there has been lately erected and is now finiſhing a range of building, which in beauty and magnificence rivals, if not exceeds, any other in this part of the kingdom. It is conſtructed in the form of a creſcent with a collonade extending the whole length of the front. The ſpan of the building is 257 feet. The collonade within the pillars is 7 feet wide, and 11 feet high.—The creſcent conſiſts of 7 dwelling houſes and an hotel. The dwelling houſes contain 11 rooms each, and the hotel 20. Beſides theſe there are 93 in the attic ſtory of the whole building. The aſſembly room, which is on the eaſt ſide of it, is 75 feet 6 inches long, 30 feet 2 inches wide, and 30 feet high. An elegant ſtone baluſtrade extends the whole length of the front, and the arms of the Cavendiſh family neatly carved in ſtone are fixed in the center. The whole number of windows in this magnificent building is 378.

It is not poſſible to aſcertain with exactneſs the number of the company, who reſort to Buxton every ſeaſon. It is computed, that the public buildings and private lodgings will accommodate 500 perſons, beſides the regular inhabitants of the place. And it is well known, that, for ſome years paſt, ſeveral perſons have occaſionally been obliged to ſeek lodgings in the neighbouring villages.

From this ſketch of the hiſtory of the warm medicinal water at Buxton, it appears, that it is poſſeſſed of a very antient and diſtinguiſhed reputation. But, whether it has a juſt, and well founded claim to it, can only be determined by a regular detail of the cures, which it has effected, or by an examination of the different ſubſtances, with which it is impregnated. In regard to the former method of inveſtigation, very little or nothing has been done. But to diſcover its chemical properties ſome pains and ingenuity have been employed. With this view ſeveral analyſes have been made. However there appears ſome diſagreement of opinion both concerning the ingredients, which the water contains, and the proportion in which they exiſt.

Dr. Percival,* who firſt analyſed Buxton water with any degree of accuracy, ſays, that it contains calcareous earth, foſſil alkali, and ſea ſalt, but in very ſmall proportion. For a gallon of the water, when evaporated, yields

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* Medical and experimental eſſays, page 63.

23 or 24 grains of ſediment. It ſtrikes a ſlight green colour with ſyrup of violets, ſuffers no change from an infuſion of galls, from fixed vegetable alkali, or from the mineral acids; becomes milky with the volatil alkali, and with ſaccharum ſaturni, and lets fall a precipitate upon the addition of a few drops of the ſolution of ſilver in the nitrous acid. The ſpecific gravity of this water is preciſely equal to that of rain water, when their temperatures are the ſame, but it weighs 4 grains in a pint lighter, when firſt taken from the ſpring. The temperature of the bath is about 82 degrees of Farenheit's thermometer, that of St. Anne's well, as it is a ſmaller body of water and expoſed to the open air, is ſomewhat leſs. The water is tranſparent, ſparkling, and highly grateful to the palate. He adds, this celebrated ſpring abounds with a mineral ſpirit or mephitic air, in which its ſtimulus, and indeed its efficacy conſiſts, and which is quickly diſſipated by expoſure to the air.

According to the account given by Dr. Higgins, Buxton water afforded, in a Wincheſter gallon, 17 grains and 16-20ths of ſediment, of which 11½ grains were calcareous earth combined with acidulous gas, 1½ grain of ſelenite, 3½ grains of ſea ſalt, 1¼ grain of marine ſalt of magneſia, and 1-20th grain was iron combined with acidulous gas, excluſive of the quantity contained in calcareous earth in the heat of boiling water.

Dr. Pearſon, whoſe analyſis is the laſt, I have ſeen or heard of, aſſerts, that the tepid ſprings at Buxton afford, upon evaporation, 16 grains of ſolid matter in a gallon of water. Of this quantity he found 1¾ of ſea ſalt, 2½ of vitriolic ſelenite, and 1·1½ of calcareous earth. He informs us alſo, that a pint of this water is from 6 to 8 grains heavier than diſtilled water, and that its temperature in the gentleman's bath is from 81¾ to 82, and in new St. Anne's well from 81 to 81¾.

In reſpect to the mineral ſpirit, contained in Buxton water, Dr. Pearſon has departed from the general opinion of thoſe, who had gone before him. He ſays, it is not fixed air, becauſe it does not reſemble it either in taſte, or the appearance of its bubles. And, as it is without ſmell, he concludes it is not hepatic vapour, or phlogiſton. He ſtiles it a permanent vapour compounded of air and phlogiſton and conſiders it as the ſame with the choke or fire damp found in coal pits. He alſo diſcovered by a ſeries of experiments, that it was unfit for the reſpiration of quadrupeds, birds, fiſh, and amphibious creatures. But he obſerves, that it may be taken into the ſtomach without injury, that light and flame are extinguiſhed by it, and that it is not at all changed by being a long time in contact with common or lime water.

However, tho' Dr. Pearſon denies the mineral ſpirit of Buxton water to be fixed air, he allows, that it contains a ſmall portion of that fluid. He ſays, that this is half the quantity of that, which is found in common ſpring water.

It is imagined, that the ſprings at Buxton have one common origin. If this be the caſe, the water, as it riſes towards the ſurface, muſt divide into ſeveral ſtreams. For it has many different diſcharges. It is ſaid, that it ſprings up not only in all the baths, but likewiſe in various parts of the earth between the hall and the creſcent.

The baths, which are three in number, have been formed at different periods. The gentlemen's has been built time immemorial, that of the ladies is of more modern date, and the other, which is appropriated to the uſe of the poor, has been, only a few years, finiſhed. They are all adjoining to one another, but in diſtinct apartments. In the gentlemen's bath the water riſes on the ſouth-eaſt ſide in a ſtratum of limeſtone, and in the other two it iſſues thro' ſeveral ſeams in the floor. It has been calculated, that all the ſprings throw out water at the rate of 60 gallons in a minute. Dr. Pearſon found, the gentleman's bath was filled to the height of five feet in 50 minutes, and that two hours and fifty minutes were required to fill all the three baths.

I am informed, that, about three quarters of a mile weſtward from the baths, other ſprings have been diſcovered, and that during the laſt ſummer a ſcheme was in agitation for erecting buildings near them for the accommodation of company. There is very ſmall room to doubt, that there are warm ſprings in this part of the valley. It has long been obſerved, that ſnow melts ſooner here than in the neighbouring country: and it does not ſeem reaſonable to aſcribe this effect to any other cauſe than the exiſtence of warm waters in this ſituation.

The medicinal virtues and uſes of Buxton water may be in ſome meaſure learnt from an attention to the ſubſtances, with which it is impregnated. By a proper knowledge of the effects, which theſe have upon the human conſtitution, ſome opinion may be formed concerning the caſes, in which it may be recommended with ſafety and advantage. However a well authenticated detail of the various cures, which it has performed, would throw equal, if not ſtill clearer, light upon the ſubject. But no ſuch regiſter has hitherto been kept. All therefore, which can be at preſent done with a view of aſcertaining the medicinal virtues of Buxton water is to mention a few diſorders, in which its beneficial efficacy has been moſt evident and deciſive. Now it may be aſſerted with the moſt unqueſtionable authority, that it has been repeatedly uſed with diſtinguiſhed ſucceſs for the gout, rheumatiſm, nephritic and bilious diſorders, and for moſt complaints in the ſtomach and bowels. It has been alſo recommended in other caſes. But as in them its ſalutary effects have not been ſo manifeſt and undoubted, it ſeems ſcarcely worth while to mention them.

There are a few circumſtances attending the uſe of Buxton water, of which it may not be improper to take notice. When drank in conſiderable quantity, it is found to poſſeſs a binding and heating quality, and is productive of many feveriſh ſymptoms. With a view of preventing ſuch diſagreeable effects, it is uſual to recommend a gentle purgative to keep the body open. However it ſometimes happens, that Buxton water, when it is firſt drank, is followed by a directly oppoſite conſequence. This I believe may generally be conſidered as a favourable ſign. At leaſt I have known inſtances, in which its ſalutary influence has been experienced, when it has operated in this manner.

There is an inconvenience attending the gentlemen's bath, which it is more eaſy to point out than to remedy. Thoſe who make uſe of it, are obliged to dreſs and undreſs in the bath room itſelf and all the time are expoſed to the warm and moiſt air with which it is filled. Perhaps in ſome complaints no bad effects may ariſe from this circumſtance; but in other diſorders it has been thought to counteract, rather than promote the good efficacy of the water. This may be reaſonably ſuppoſed to be the caſe with perſons of a relaxed habit, who make uſe of the bath as a cold one, with a view of bracing and ſtrengthening the ſyſtem.

Tho' the ladies bath is not ſubject to the inconvenience I have now mentioned, yet it will admit of improvement. If the dreſſing room opened directly into the bath room, ſuch an alteration would render it more ſafe, and commodious.

The expences at the ſeveral houſes, which are open for the reception of company are not materially different. But the company from the Hall, and the Eagle and Child (both the property of the Duke of Devonſhire) have the priviledge of bathing at an earlier hour than thoſe, who come from any other lodging houſe.

The poor at their bath are not only exempted from all charge, but alſo meet with great aſſiſtance and ſupport from the charitable contribution of the company, who reſort to Buxton. It is cuſtomary for every new comer, if he ſtays more than one day, to give a ſhilling for their uſe, which is collected and taken care of by the ſteward of the houſe in which he happens to lodge. And the ſum raiſed in this way during the courſe of the ſeaſon has ſome years paſt been very conſiderable. The common weekly allowance to the poor is ſix ſhillings, and ſhould any of them be more weak and neceſſitous than ordinary, it is uſual to add four ſhillings to ſuch a charity.

Buxton is a place of reſort for pleaſure as well as health. The common amuſements are, in the morning, taking the air, and ſometimes hunting, and, in the evening, plays or dancing. To the former purpoſes the neighbouring country is excellently adapted. Being high and open it forms a pleaſing contraſt to thoſe, who are accuſtomed to low or flat ſituations. When a dance is intended at any of the houſes, it is uſual to ſend cards of invitation to the company, who lodge in other parts of the village, and thoſe, who wiſh to join in the amuſement, aſſemble immediately after ſupper.

Matlock water and bath.

The warm ſprings at Matlock have not been ſo long diſcovered, nor are they poſſeſſed of ſo high a reputation as thoſe ſituated at Buxton. They were firſt noticed about the year 1698, when the bath was paved and built by the Rev. Mr. Fern of Matlock and Mr. Heyward of Cromford. It was afterwards put into the hands of George Wragg, who to confirm his claim and title took a leaſe of it from the ſeveral lords of the manor for 99 years, paying them a fine of 150 pounds and the yearly rent of ſix-pence each. He then built a few ſmall rooms adjoining to the bath, which, it is ſaid, were but a poor convenience for ſtrangers. The leaſe and property of Wragg were afterwards purchaſed by Meſſrs. Smith and Penel of Nottingham for nearly 1000l. Theſe gentlemen erected two large commodious buildings with ſtables and other conveniences, and made a coach road to Matlock Bridge. In a ſhort time afterwards this road was carried down the valley towards Cromford, and a paſſage blaſted thro' the rock near that place, by means of which a communication was opened with the ſouthern part of the county.

Some years after another ſpring was diſcovered at the diſtance of about a quarter of a mile from the old one. In this ſituation likewiſe a bath was formed, a lodging houſe built, and other conveniences provided for the accommodation of the company, who might reſort thither.

At a ſtill later period a third ſpring was met with three or four hundred yards eaſt of that, which was firſt noticed, but being of a colder temperature than either of the other, was neglected. It being however imagined, that the water flowing from it was mixed with another ſpring, ſeveral attempts were then made to ſeparate them from each other; and in the ſummer of 1786 the means employed for this purpoſe were attended with the deſired ſucceſs. By driving a level into the hill, they have gone beyond the point, where the two ſorts of water mix, and conveyed the warmer by a proper channel into a bath, which has been built near a lodging houſe, lately opened for the reception of company.

The water at Matlock, like that at Buxton, has gradually riſen to the degree of reputation, which it now poſſeſſes. Some idea may be formed of the eſteem, in which it is held from the company, which frequent the place every ſeaſon. It is calculated, that the bath houſes, in conjunction with the private lodgings in their neighbourhood, will accommodate about 150 perſons; and it is well known that, during the height of the laſt ſeaſons, they were not large enough to receive all the company, which viſited the place.

According to Dr. Percival, Matlock water is grateful to the palate and of an agreeable warmth, but exhibits no marks of any mineral ſpirit either by its taſte, ſparkling appearance in the glaſs, or with ſyrup of violets. It is very ſlightly impregnated with ſelenite or other earthy ſalts, and of this its comparative levity affords alſo a further proof. It weighs only 4 grains in a pint heavier than diſtilled water. The precipitation of a grey powder, by adding a ſolution of ſilver in aqua fortis to the water, renders it probable that a ſmall portion of ſea ſalt is contained in it.

Dr. Pearſon ſays, it has been reported to contain in a gallon of water 40 grains of ſediment, which is called nitre, alkaline earth, and ſea ſalt. He obſerves himſelf, that it is impregnated with rather more fixed air, than Buxton water, and that a pint weighs eight grains heavier than diſtilled water.

I found, that with ſyrup of violets the water at the ſpring upon the hill was turned greeniſh and therefore conclude, that it contains a ſmall quantity of foſſil alkali. Upon the addition of galls and Pruſſian lixivium no change whatever was produced. That it contains calcareous earth will not admit of a doubt. This is manifeſt from the copious precipitate, which takes place upon adding the fixed vegetable alkali, but more eſpecially from the large quantity of this ſubſtance, which is depoſited in the kettles, and other veſſels, in which it is uſually boiled. On pouring vitriolic acid on a ſmall portion of ſediment, collected in this manner, a very ſtrong effervеſcence enſued.

In reſpect to the temperature of Matlock water it is found, that Farenheit's thermometer riſes in it to 66 degrees at the ſpring, and 68 in the bath. But the water at the ſpring upon the hill has about one degree leſs of heat. The ſpring, which was laſt diſcovered, was at firſt reported to be 6 or 7 degrees warmer than either of the other two, but is now ſaid to be of nearly the ſame temperature.

Perhaps it may throw ſtill additional light upon the nature of Matlock water to obſerve, that the following plants generally grow and flouriſh in it, water creſſes, horſe mint, brook lime, garlic, ſcurvy graſs. For I am informed theſe contain volatil alkali, both fluid and concrete, and empyreumatic oil, ſubſtances which are found in all animal bodies. From analogy it ſeems therefore not unreaſonable to conclude, that the ingredients, which it contains, are friendly to the conſtitution of man.

Dr. Percival § obſerves, that Briſtol and Matlock waters appear to reſemble each other both in their chemical and medicinal qualities. In Hectic caſes, hæmoptoes, the diabetes, and other diſorders, in which the circulation of the blood is quick and irregular, he apprehends Matlock water on ſome accounts claims the preference to that of Briſtol. For as it is not ſenſibly impregnated with a mineral ſpirit, it ſhould ſeem leſs diſpoſed to quicken the pulſe, and may therefore be drank in larger quantity. But it muſt be acknowledged, that the climate of Briſtol is ſuperior to that of Matlock; a circumſtance of the higheſt importance to conſumptive patients. Situated in a deep tho' delightful valley and ſurrounded by very high mountains, the ſun diſappears at Matlock earlier in the evening, the fogs are longer in diſperſing, and, it may be preſumed, rain falls here more frequently and copiouſly than in other places. For, at Chatſworth, which is encompaſſed alſo with hills and is

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§ Medical and experimental eſſays, page 60.

about 10 miles diſtant, in 1764, 1765, 1767, 1768, about 33 inches of rain fell at a medium each year.

Since Dr. Percival made his obſervations on the impregnation and uſes of Matlock water, Dr. Francis Armſtrong, Phyſician at Uppingham in the county of Rutland, has addreſſed the public on the ſame ſubject.† He ſays, I have taken great pains to examine particularly into the properties of Matlock ſprings and may with truth aſſert, that they are of the ſame nature with the Briſtol water, equal in ſome caſes, and preferable in many. Nor do I think that the air of Matlock is in the leaſt unfavourable to conſumptive patients, where the lungs are not injured in ſuch a manner, as to render a recovery very doubtful, either from the uſe of medicine or water; nor have I, in my whole practice, had the leaſt complaint of this inconvenience from any of my patients.

I ordered a moſt amiable lady laſt year to drink the Matlock waters in a confirmed phtiſis pulmonalis, and in ſuch a ſituation, that I muſt own, I never expected to ſee her return. Being greatly intereſted in her preſervation, I gave her full directions how to proceed. With much difficulty ſhe reached the place. The company, in a very uncandid manner, cried out, " What a cruel phyſician, to ſend the lady ſo far from home to die!" I ſaw the lady but three days before ſhe left home, otherwiſe ſhe would have viſited Matlock much ſooner. She ſtrictly perſevered in the rules laid down, and in a fortnight was able to dine in public; in ſix weeks was perfectly recovered, having got rid of her cough and being greatly encreaſed in muſcular habit. I viſited her on her return, and had I not been perfectly acquainted with her before, I ſhould not have known her. She has continued well ever ſince, and I hope will for many years, as a bleſſing to her young family and a comfort to the beſt of huſbands.

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† Medical Commentaries, vol. 7. page 379

I hope I ſhall be excuſed reciting this caſe, it being one, amongſt many, in which I have experienced the good effects of this water; and indeed patients, whom I have ſent to Briſtol, and who have returned, benefited in ſome meaſure, have afterwards been reſtored to a perfect and laſting ſtate of health, from the uſe of Matlock water.

I have, in the courſe of ſeven years, ſent a great number of patients to Matlock, and in caſes where medicine had not the leaſt proſpect of being ſerviceable; all of whom have had perfect and laſting cures; and I may with truth declare, I have not failed in one inſtance. However contrary to the opinion of ſome my practice may be, I have, after repeated trials, found, that in many caſes much advantage has been gained by the adminiſtration of medicines in conjunction with the courſe of water-drinking; being well-timed, ſo as to act in an uniform manner, they had excellent effects, the water being greatly aſſiſted in its operation.

As for the bath (if I may be allowed the expreſſion) it is the coldeſt hot bath of any I know in Europe; and from its temperature, it may with propriety be uſed either as a cold or hot bath.

I perfectly agree with Dr. Percival that a larger quantity of Matlock water may be drunk at a time, than of any other mineral water I am acquainted with, owing to the entire abſence of any mineral ſpirit; yet it is always adviſeable to begin with ſmall quantities. From the want of mineral ſpirit it is leſs apt to throw the circulation of the blood into irregularities, or quicken the pulſe; and therefore it muſt have the preference to Briſtol water in phtiſis pulmonalis, hæmoptoe, diabetes, fluor albus, &c. In all theſe, I have experienced the moſt happy effects from it, as well as in hectic and low fevers, in hyſteric and hypochondriac affections, in a profluvium or deficiency of the catamenia, in bilious diſorders, in conſtitutions debilitated by long and ſevere vernal and autumnal intermittents, in diſorders ariſing from long reſidence in hot climates, in broken conſtitutions brought on by hard and habitual drinking, and in weak or depraved appetites.

The value of this communication would have been much encreaſed, if Dr. Armſtrong had favoured the public with his general treatment of the patients, who have been fortunately under his care. He appears to lay conſiderable ſtreſs upon the uſe of medicines in conjunction with the courſe of water drinking. But it is obvious, that without a knowledge of thoſe in particular, which he adminiſtered, Matlock ſprings may fail of having the effect, which he has found them to produce. However tho' the public at large cannot avail themſelves of the information, which he has given, in the degree, which they may wiſh, yet perhaps the hint, which he has ſuggeſted, may be ſufficient for the uſe of gentlemen of his own profeſſion.

The expences, cuſtoms, and amuſements at Matlock are nearly the ſame as thoſe at Buxton. But in the laſt reſpect it is generally thought to be much ſuperior. On this account it is more reſorted to for pleaſure than Buxton.

Water and bath at Stoney Middleton.

Dr. Bullock informed me, that the warm water at Stoney Middleton in its chemical properties, and medicinal virtues very much reſembles that at Matlock. He alſo ſaid, that in the bath the thermometer ſtands at 63 degrees, but in two other ſprings at a ſmall diſtance from it it riſes only to 60. Dr. Pearſon ſays, that a pint of this water weighs 6 grains heavier than diſtilled, and 2 than Matlock water.

Stoney Middleton has hitherto been little viſited or frequented on account of its warm ſprings. Perhaps if the bath, which is only encloſed by a high wall and expoſed to the open air, was covered in and a convenient room built adjoining to it, ſuch an improvement might induce a greater number of perſons to try, of what efficacy the water is poſſeſſed. But ſuppoſing its medicinal virtues equal to thoſe of Matlock, it cannot be reaſonably expected, that Stoney Middleton will ever become a place of ſo general reſort, as it is greatly wanting in that charming ſcenery, by which Matlock is ſo eminently diſtinguiſhed.

Formerly there were at Middleton near Wirkſworth a warm ſpring and bath. But the water, by which they were ſupplied, is now entirely loſt. It was taken away by a ſough, which was driven ſome years ago with a view of laying ſome lead mines dry in the neighbourhood.

Beſides the warm ſprings, which have now been enumerated there are a few other in the vicinity of Matlock. I have been informed, that there is one in particular in a mine betwixt the old and new baths, but on the oppoſite ſide of the river Derwent.

SULPHUREOUS WATERS.

Very different opinions have been and ſtill are entertained concerning the actual preſence of ſulphur in thoſe waters, which come under this denomination. On the one hand it is aſſerted, that they do not contain it ſubſtantially diſſolved in them, but are impregnated with phlogiſton and an acid the principles of ſulphur. It is ſaid, that theſe being in a volatile ſtate are ſublimed, meet on the ſurface of the water, and there unite into a true and perfect ſulphur, which did not naturally exiſt in the water. On the other hand perſons no leſs eminent for their chemical knowledge have maintained, that ſulphur does actually exiſt in mineral waters and that to account for their impregnation it is entirely unneceſſary to have recourſe to any ſuch hypotheſis.

A ſtill different account has been given by later chemiſts of the mineralizing principle of theſe waters. Profeſſor Bergman thought, that a genuine liver of ſulphur is rarely preſent in mineral waters, although it is fallaciouſly indicated by an hepatic vapour, conſiſting of ſulphur reſolved into the form of vapour by means of phlogiſton and the matter of heat. He ſuppoſed, that this vapour is decompoſed in the atmoſphere by means of pure air, which attracts phlogiſton ſo greedily that it is able to ſeparate it from nitrous acid itſelf. The connecting medium being ſeparated above the ſurface of the water, the whole compound is diſſolved, and the diſengaged particles of ſulphur adhere to the ſurrounding bodies.

Dr. Faulconer in his treatiſe upon Bath water endeavours to ſhew, that ſulphur may be held in water by lime, and thus become a liver of ſulphur; and Dr. Walker imagines that ſulphureous waters of the volatile kind receive their impregnation from the decompoſition of the liver of ſulphur by means of the ſuperabundant acid contained in aluminous ſlate. This opinion, he thinks, is ſupported by an attention to the nature of the ground in the neighbourhood of the wells at Harrogate.

M. de Fourcroy imagines, that ſome waters contain the liver of ſulphur, and that others are mineralized by hepatic gaz. He accordingly divides ſulphureous waters into hepatic, and hepatized.

From theſe different opinions it is manifeſt, that waters of this claſs contain ſulphur in ſome form. It is alſo probable, that it does not exiſt in all in the ſame ſtate. Having given this view of the ſentiments of different writers on the impregnation of ſulphureous waters, I ſhall now enumerate thoſe, with which I am acquainted in Derbyſhire. But before I do this, it may be proper to add, that theſe waters contain alſo either the foſſil alkali, ſea ſalt, a purging ſalt, iron, an earth or other matters, and commonly ſeveral of theſe in different proportions.

Sulphureous ſpring and bath at Kedleſton.

The moſt renowned ſulphureous water in Derbyſhire is ſituated at Kedleſton, in the park belonging to Lord Scarſdale. That this water is impregnated with ſulphur in ſome ſtate or form appears not only from its ſtrong taſte and ſmell, but likewiſe from its changing ſilver to a dark copper colour. In the well it is of a blackiſh blue colour tinged with purple and gives the ſame appearance to all ſubſtances thrown into it. But in a glaſs it looks very clear and tranſparent. However when it has ſtood ſome time a duſkineſs comes on, which is ſoon followed by a total loſs of ſcent and taſte. In its paſſage from the well it depoſits a whitiſh ſediment, which has the appearance of ſulphur.

Dr. Short a long time ago obſerved, that the black ſediment and white ſcum attending waters of this claſs gave clear indications, on a hot iron, of their containing ſulphur. From his examination of that at Kedleſton in particular it appears, that it is impregnated with other ſubſtances alſo. He ſays, that eight pints of it evaporated left two ſcruples of ſediments, 21 grains of which were a dark browniſh earth and the reſt ſalt.

Dr. Watſon, who has examined Harrogate water remarks, that thoſe, who have analyſed it, have met with a brown ſubſtance, which they knew not what to make of, and has himſelf attempted to explain its nature. He attributes the colour of the ſediment to an empyreumatic oil, with which he ſuppoſes, that ſulphureous waters are impregnated. Perhaps this may account for the dark appearance of the earth, which Dr. Short found in the water at

Kedleſton. I am informed, that when mixed with the chalybeate water at Quarndon it immediately becomes black.

The temperature of the ſpring is about 47 degrees.

Kedleſton water is principally valued for the antiſcorbutic quality, of which it is poſſeſſed. When taken inwardly it is diuretic, and has given relief to perſons afflicted with the gravel. It has alſo been found uſeful from external application. In this way it is ſaid to have been employed with advantage in moſt diſeaſes of the ſkin, but more eſpecially in ulcerous complaints.

This water, when drank in quantity, I am informed has a binding property, and perſons of a coſtive bodily habit cannot conveniently make uſe of it without a gentle opening medicine. But upon others its effects are ſaid to be directly the reverſe.

Beſides the water, which is drank at the ſpring, a conſiderable quantity is carried every day to the town of Derby, and is there uſed by the inhabitants at their meals, as a ſubſtitute for malt liquor. It is ſold at a penny per quart bottle, and the carriage of it affords ſubſiſtence to a few poor people in the neighbourhood.

Between 20 and 30 years ago Lord Scarſdale encloſed the ſpring with a handſome building. In the part fronting his houſe is a portico ſupported by a collonade and on each ſide of the well is a bath with ſuitable conveniences.

For the accommodation of thoſe, who wiſh to try the efficacy of this water, his Lordſhip has built a good houſe in its neighbourhood. But ſome ſeaſons it has been found ſcarcely large enough to receive all the company, who have reſorted to the place.

Spring and bath at Cawley near Dronfield.

I have not ſeen or examined the ſulphureous water at this place. Dr. Short ſays, that with tincture of galls it firſt turns muddy and afterwards green throughout. He alſo obſerves, that three pints and a half exhaled left of a white pungent ſaline ſediment 17 grains, 4 of which were earth, aud the remainder nitre. He adds, that it is gently purgative and is recommended in chronic obſtruction, in caſes of worms, and foulneſs of the blood.

At Cawley there is a bath as well as ſpring. But being expoſed to the open air, it is not much uſed.

Sulphureous ſpring and bath at Shuttlewood near Bolſover.

The water at this place is ſo ſlightly impregnated with ſulphur, that it can ſcarcely be perceived either by its taſte or ſcent. According to Dr. Short the quantity of ſea ſalt, which it contains, is alſo very inconſiderable.

The bath is not covered in or even incloſed with a wall, and the ſituation being exceedingly inconvenient, it is ſeldom uſed even by thoſe, who reſide in the neighbourhood.

Agnes and Mudge meadow wells.

About three miles from Aſhbourn and half of one on the left ſide of the road, leading from thence to Wirkſworth, are two ſulphureous ſprings, which are known in the neighbourhood by the names of Agnes and Mudge meadow wells. They are ſituated at the diſtance of about a quarter of a mile from each other. I have not ſeen them myſelf, nor have I heard, that the water has been ever analyſed. But from the information I have been able to obtain, it appears very much to reſemble that at Kedleſton. There is no bath at either of the ſprings.

Shottle ſpring.

In the higher part of Shottle, a hamlet ſituated in the pariſh of Duffield, there is a ſulphureous ſpring. From the ſcent and taſte the impregnation appears to be but ſmall. By evaporating a pint of the water a whitiſh reſiduum looking like ſulphur was obtained. It had a ſharp and acid taſte, and when ſwallowed occaſioned a dryneſs and irritation in the throat and ſtomach.

This water has not hitherto been much drank. Its medicinal virtues are therefore little known or underſtood.——It may be deſerving of notice, that at the diſtance of a few yards from it there is alſo a chalybeate ſpring.

Wirkſworth ſpring.

At a ſmall diſtance from the town, and near the road leading to Aſhborne is a ſpring, which contains both ſulphur and iron. But the quantity of each is very inconſiderable. It is ſaid to be alſo impregnated with a purging ſalt and to operate by ſtools.

CHALYBEATE WATERS.

It has been diſcovered by M. de Morveau and is now generally allowed by the beſt chemiſts, that waters of this claſs contain iron diſſolved, and ſuſpended by fixed air, or vitriolic acid. Perhaps in ſome inſtances both theſe agents may be employed. It is found, that thoſe waters, in which fixed air is the menſtruum, upon being boiled immediately loſe this principle, and the iron is precipitated in the form of a brown powder. Whereas, if this metal is held in the water by vitriolic acid, the moſt intenſe heat cannot ſeparate them from each other. They will continue united, till the water is entirely evaporated, and, if mixed in a juſt proportion, a true cryſtal of copperas will be produced. The reaſon, why I apprehend, that in ſome waters the iron is diſſolved by both fixed air and vitriolic acid, is that the mineralizing principle is not in every inſtance expelled with the ſame degree of eaſe. Sometimes a very gentle heat, applied for a ſhort time, will be ſufficient to produce this effect. I have alſo found it neceſſary ſometimes to continue the water a conſiderable time upon a very hot fire, before galls loſt their power of changing its colour.

Beſides iron theſe waters are ſaid uſually to contain ſea ſalt, the foſſil alkali, a purging ſalt and ſometimes other mineral ſubſtances.

Chalybeate waters are ſaid to be the moſt uſeful, and beneficial to health of any of the mineral waters. But this aſſertion muſt be underſtood in a reſtrained ſenſe. It cannot with propriety be extended to thoſe waters, which contain iron held in ſolution by vitriolic acid. For their uſefulneſs and innocence muſt be greatly affected, if not entirely deſtroyed by ſuch an ingredient. Accordingly thoſe waters are juſtly eſteemed the moſt valuable, which part with their menſtruum in the moſt quick and eaſy manner.

Waters of this claſs are ſaid to encreaſe the tone of the fibres, quicken the circulation, and reſtore a proper conſiſtence to the blood, when in a too thin and watery ſtate; and on theſe accounts they muſt ſtrengthen and invigorate the whole frame. That they will produce theſe ſalutary effects may be inferred from the tonic and ſtimulating powers of the two principal ingredients, with which the water is impregnated. It may therefore be expected, that they will be found uſeful in moſt diſorders ariſing from weakneſs, and in ſpaſmodic affections owing to too great irritability and relaxation of the nervous ſyſtem. They are alſo recommended in hyſteric and hypochondriacal diſorders, in loſs of appetite and digeſtion, and in a variety of other complaints.

In uſing chalybeate waters ſome degree of caution is neceſſary to ſecure their beneficial influence. Coſtiveneſs ſhould be avoided and gentle exerciſe uſed. Acids, tea, and all aſtringent ſubſtances, which decompoſe theſe waters, ſhould not be taken immediately before or after drinking them. It is alſo adviſeable, to begin with a ſmall quantity or to dilute the water with milk. If it be too cold for the ſtomach, a little warm water may be added.

There is no kind of mineral water in Derbyſhire found in ſo great number, as thoſe of a chalybeate nature. Nor will it appear difficult to account for this fact, when it is recollected thro' what a large extent of country iron ore and ſhale are met with. Being thus numerous, I ſhall take notice of a few only, which are in the greateſt repute.

Chalybeate water at Quarndon.

The moſt celebrated chalybeate water in this county, with which I am acquainted, is ſituated at Quarndon about two miles diſtant from Derby. Dr. Short ſays, that a pint contains a grain of fixed ſalt, and that two gallons, when evaporated, left half a dram of a light coloured ſediment, half of which was nitrous earth.

I found, that with gall ſhavings Quarndon water was turned to a very deep purple, approaching nearly to a black, and that, upon adding a few drops of the Pruſſian lixivium, about ⅔ of the mixture in the higher part of the glaſs became a fine light blue, and the remainder at the bottom was changed to a deep green colour. The fixed air, by which the iron is held in ſolution, may, in a few minutes, be ſet at liberty with a moderate degree of heat.

The temperature of the water is about 49½ degrees.

This water, when taken in ſufficient quantity, is found by ſome to be purgative. However, if it be drank by others without uſing exerciſe, it does not paſs the ſtomach with eaſe.

Perſons of a weak and relaxed habit have been much benefited by the uſe of this water. After drinking it a few days they have found their ſpirits and ſtrength return in a ſurpriſing manner, and in the ſpace of a month a cure has been entirely effected.

The chalybeate ſpring at Quarndon is a good deal frequented every ſummer. It is drank not only by thoſe, who take lodgings in the village for that purpoſe, but ſometimes alſo by the company, who reſort to Kedleſton, which is only about half a mile diſtant from hence.

Chalybeate ſpring at Buxton.

At the diſtance of about 150 yards from the warm ſpring at Buxton, there is a chalybeate water, which bears a great reſemblance to that at Quarndon. The chief circumſtance, in which it differs from it, is, that when heated it retains its fixed air rather longer, and when drank, has a more rough and irony taſte. Dr. Pearſon ſays, that it contains iron diſſolved in vitriolic acid, but does not mention by what means he diſcovered this to be the menſtruum. I am apprehenſive, that there is reaſon to ſuſpect his accuracy in this inſtance. For, after boiling a ſmall quantity of this water with an intenſe heat about five minutes, I found, that gall ſhavings were incapable of producing any change in its colour. I mean not however to deny the preſence of a very ſmall quantity of vitriol. If it did not contain a certain proportion of this acid, I imagine a more gentle heat would be ſufficient to precipitate the iron, than I found neceſſary for this purpoſe. The water was expoſed to a hot and clear ſunſhine for 8 or 10 hours, and yet at the end of that time gall ſhavings turned it to a very deep purple. From this circumſtance it ſeems alſo probable, that it contains ſome mineralizing principle beſides fixed air.

Dr. Pearſon ſays, that the heat of this water is from 52 to 55 degrees.

Chalybeate ſprings at Morley and Whittington.

In an encloſure, near the houſe of the Rev. Robert Wilmot, is a chalybeate water, which, from the teſts I employed in the two foregoing inſtances, appears to contain about the ſame quantity of iron as thoſe, ſituated at Quarndon and Buxton. The reſpect, in which it moſt materially differs from them is, that it parts more freely with the fixed air, with which it is impregnated. M. de Fourcroy obſerves that in ſome chalybeate waters the iron, and in ſome the fixed air exceeds the other. From the briſk acidulous taſte of that at Morley in particular, I ſhould apprehend, that it contains the latter proportion.

There is a chalybeate water at Whittington alſo, in a farm occupied by Mr. Lalouell, which appears to be poſſeſſed of nearly the ſame degree of ſtrength with that ſituated at Morley.

Chalybeate ſpring at Cheſterfield.

The chalybeate ſpring at Cheſterfield is much weaker than any of thoſe, which I have mentioned. This may be inferred from the faintneſs of the colour, which it ſtrikes with galls. Upon adding a few drops of Pruſſian lixivium to a glaſs of this water, one half of the quantity was changed to a fine blue, and the other to a deep green colour.

I have been informed, that, when drank in ſufficient quantity, it is purgative, and that it has been found uſeful in diſorders, ariſing from weakneſs and relaxation.

Tibſhelf ſpring.

The chalybeate water at Tibſhelf does not appear to be materially different from that, which was laſt mentioned. About a century ago it was much valued, and drank throughout the ſummer ſeaſon. But it does not appear to be now in any repute.

Duffield and Bradley ſprings.

About a quarter of a mile from Duffield, and in an encloſure near the turnpike road leading to Derby, there is another ſpring apparently of the ſame impregnation and quality with the two preceding.

At Bradley, near the houſe of Hugo Meynell, Eſq. there is alſo a chalybeate water, which bears ſo great reſemblance to the three laſt, which I have mentioned, that by the teſts I have employed to aſcertain the ſubſtances, which they contain, it would be difficult to diſcern any difference among them.

Beſides the chalybeate ſprings, which I have now pointed out, I am ſenſible, there are many more ſituated in various other parts of Derbyſhire. But all thoſe, which are in much public repute, I believe, may be found in the account, which has now been given.

Martial vitriolic ſpring at Heage.

I have heard of only one ſpring of this kind in Derbyſhire. It is ſituated in the liberty of Heage, near the road lying betwixt Crich and Belper, and at about a middle diſtance from both places. The water affords very ſtrong and deciſive evidence of being impregnated with both iron and vitriol. It has a ſour, auſtere taſte. With galls it becomes almoſt as black as ink. Pruſſian lixivium changes it into a deep blue; ſyrup of violets turns it to an olive green, and upon adding the fixed vegetable alkali a ruſty precipitate appears at the bottom of the glaſs. By evaporating a few pints of this water a reſiduum of the ſame reddiſh brown colour, and of an acid taſte was obtained. But no cryſtals of copperas could be perceived to form during the evaporation. Perhaps this effect might be prevented by the fixed air, which it moſt probably contains. For this fluid being expelled by the heat, the iron, which is diſſolved and ſuſpended by it, would be precipitated, and occaſion that ruſty appearance, which was obſervable in the reſiduum, and conceal the cryſtals, if any were formed. That this water does contain fixed air may be inferred from the number of air bubbles, which may be ſeen in it, when it is firſt poured into a glaſs at the ſpring.

Another circumſtance, which tends to confirm this opinion, is, that when tightly encloſed in a bottle or caſk, it will with a ſlight degree of agitation break it; an effect which is moſt probably owing to the effort of this fluid to make its eſcape.

The mineral water at Heage is ſituated in a black boggy ſoil. It was diſcovered about 20 years ago by a labouring man, who was employed in forming a ſough, with a view of draining the ground in its neighbourhood. He had been a long time troubled with an ulcerous diſorder in one of his legs, but found, during the proſecution of his undertaking, it gradually diſappeared, and that, by the time it was finiſhed, a cure was entirely effected. This circumſtance led him to ſuſpect, that the water was poſſeſſed of ſome medicinal virtues, and upon examination he perceived the vitriolic taſte, by which it is diſtinguiſhed.

The beneficial efficacy of Heage water has likewiſe been experienced in a few other caſes. It has been found uſeful in ſtopping inward bleeding, and when applied outwardly, I am informed, it has this effect as ſoon and completely, as extract of Saturn. It is good for faſtening the teeth, and for healing ſore and inflamed eyes. But its ſalutary virtues are ſaid to be moſt conſpicuous, and certain in ulcerous diſorders. However it is ſaid that in all external applications it ſhould be uſed with great caution. For in a caſe of this kind a paralytic ſtroke in the diſeaſed part has been ſuppoſed to be the conſequence of too ſuddenly drying up the humour.

Salt ſpring at Edintree near Hope.

M. de Fourcroy ſays, that ſaline waters contain beſides common ſalt, ſometimes two or three different ſorts. He thinks, that ſalt with the baſe of magneſia is a more common ingredient in them, than is at preſent imagined.

I have heard of only one ſalt ſpring in Derbyſhire. It is ſituated in the high Peak, betwixt the villages of Hope and Bradwell, and near a rock called Edintree. I have not ſeen it myſelf, though I took ſome pains to diſcover it, but am credibly informed, that the impregnation is conſiderably ſtrong. It is ſaid to be uſeful in ulcerous, and ſcorbutic complaints.

Intermitting ſprings.

Beſides medicinal, there are a few other ſprings in Derbyſhire, which, on account of ſome ſingular and extraordinary circumſtances, with which they are attended, ſeem entitled to ſome degree of notice.

One of theſe ſprings is ſituated on the weſt ſide of Peak foreſt and about half a mile diſtant from Sparrow Pits. It is called Barmour ebbing and flowing well. The motion of the water, from which it has received its name is not regular, but entirely depends upon the quantity of rain, which falls at various ſeaſons of the year. In long and continued dry weather, it has ſometimes ceaſed to flow during the ſpace of three weeks or a month: I was informed at the farm houſe near the ſpring, that in the courſe of the laſt thirty years two inſtances of this kind had occurred. At the time I ſaw it, which was in a wet ſeaſon, the interval betwixt ebbing and flowing was about five minutes.

The well is ſituated at the foot of a ſteep hill which riſes to the height of 80 or 100 feet. In this a ſmall gurgling noiſe is heard at a diſtance a few moments before the water makes its appearance. It then flows out at ſeveral different places, and forms a ſtream nearly large enough to turn the overſhot wheel of a corn mill.

The hill, from which the water proceeds, is compoſed of limeſtone, and perhaps this circumſtance may have ſome influence upon its temperature, which is ſaid to be warmer than that of common ſprings. It is found, that in the ſevereſt weather it is never frozen, and that a ſteam always riſes from it at ſuch ſeaſons.

There ſeems to be only one ſatisfactory way of accounting for the irregular flowing of this ſpring. If we conſider it as a natural ſyphon in the earth, we ſhall be able to explain moſt of the phænomena, with which it is attended. Thoſe, who underſtand the principles upon which this inſtrument acts, and conſider the internal ſtructure of the earth in this part of the county, will find no difficulty in accounting for the various motions obſervable in reſpect to the flowing of this water. Nor would it be eaſy to add any thing to render ſuch a matter more clear and intelligible.

There was formerly a ſpring of this kind at Tideſwell likewiſe. But it has now entirely ceaſed to flow, and the place, where the well was ſituated, is ſcarcely known. It appears from the philoſophical tranſactions that in the year 1729 it was viſited by Mr. J. Martyn, who obſerves, that the ebbing and flowing well was at that time far from being regular. He adds, that it was ſeldom ſeen by the neighbours themſelves, and that for his own part he waited a good while at it to no purpoſe. Upon enquiry I found, that it is now very imperfectly remembered by any perſon; but I was informed, that the well, which is now cloſed up, might be eaſily reſtored to its ancient ſtate.

At Chelmorton, a village ſituated about three miles ſouth eaſt of Buxton, there is a ſpring, attended with a different circumſtance, which has been conſidered by ſome as very ſingular. The water which riſes out of the ground at the head of the village, appears at firſt in a very conſiderable ſtream, but, as it proceeds, gradually diminiſhes, till at length it is entirely ſunk into the earth. Formerly it ran the whole length of the ſtreet, and in its courſe ſupplied the wants of all the inhabitants. But ſince the very ſevere froſt in the year 1740 it has reached only about half that diſtance from its ſource, tho' I believe, the body of water, when it riſes out of the earth, is the ſame now as it was, before that event took place.

Whoever pays a proper degree of attention to the ground, over which this water flows will find no great difficulty in accounting for the fact, which has now been related. The ſoil appears to be a light calcareous earth, thro' which moiſture will eaſily paſs: and, as this part of the country abounds with chaſms or fiſſures, it is not improbable, that the courſe of the ſtream may lie over one of theſe openings, which will readily receive the water, after it has paſſed thro' the ſoil, with which it is covered.

To the foregoing account of the mineral and other remarkable ſprings in Derbyſhire I ſhall ſubjoin a few obſervations on the more common ones, which are found in a pretty large diſtrict in the county.

Ingenious theories have been formed with a view of accounting for the origin of ſprings in general. But I have not met with any, which have appeared to me quite ſatisfactory. If ſpeculations on this ſubject ſeem only plauſible, perhaps this is all, which can be reaſonably expected. However, tho' we may be unable to inveſtigate the primary cauſe of ſprings of water, yet the ſecondary is not ſo much hidden from our view. At leaſt in ſome particular ſituations, it may, I think, be diſcovered with clearneſs and certainty.

When I deſcribed the ſtrata, of which the earth is compoſed in that part of the country, where coal is found, I obſerved, that they were frequently interſected by thick walls of clay. Now, whenever theſe occur, it is manifeſt, that the currents of water, which paſs between the ſtrata, will be ſtopt in their courſe, and be forced up thro' the fiſſures to the ſurface of the ground. Accordingly it is found, that when the faults are pierced thro' near a ſpring, it immediately diſappears, and is totally loſt.

The fact, which I have now mentioned as ſerving to explain the ſecondary cauſe of ſprings of water in ſome particular ſituations, may perhaps throw ſome degree of light upon them in other places alſo. It ſeems not improbable, that obſtructions of a different kind may have the ſame effect upon the ſubterraneous ſtreams, which are met with in almoſt every part of the globe, and that one chief reaſon why ſprings are more abundant in ſome ſituations, than in other, is, that theſe obſtructions are here more numerous.

Having finiſhed the obſervations, which I have been able to make and collect, in reſpect to the medicinal, and other ſprings in Derbyſhire, I ſhall now ſubjoin a letter on the ſame ſubject with which Dr. Darwin has been ſo obliging, as to favour me. The reſpectable name of the writer, I am perſuaded, will be ſufficient to excite the curioſity and attention of the public, and from the novelty and ingenuity, which appear in ſome of the remarks, it may be preſumed, that they will not be diſappointed in their expectations.

Derby, Feb. 5, 1788.

Dear Sir,

In compliance with your requeſt I ſend you on paper, what has occur'd to me about the natural hiſtory of the Buxton and Matlock waters.

Several philoſophers have ſuppoſed, that the warm ſprings of this country acquire their heat from the chemical decompoſition of pyrites; and it was affirmed by the late Mr. Tiſſington, which has been lately cited in an ingenious work of Mr. Kirwan on mineralogy, that the warm water about Matlock ow'd its heat to the blue marle, which is mixed with pyrites, and is found in thin ſtrata above and below the beds of lava or toadſtone; for an account of which ſee Mr. Whitehurſt's valuable book on the theory of the earth. But it has ſince been obſerved, that tho' warm water was found ſometimes in theſe beds of Pyrites and marle; yet that no ſmell or taſte then attended it; which muſt have occur'd, if the pyrites had been in a ſtate of decompoſition. And ſecondly that cold water was found in theſe beds oftener than warm.

The arguments in favor of another opinion appear to me to be much more concluſive, viz. that the water of theſe ſprings is raiſed in vapour by ſubterraneous fires deep in the earth; and that this vapour is condenſed under the ſurface of the mountains in the vicinity of the ſprings.

1. The heat of theſe ſprings has been invariable perhaps for many centuries, certainly as long as we have had good thermometers; which ſhews that the water, which they ariſe from, is in a boiling ſtate in ſome part of the earth. For as boiling water acquires a certain degree of heat, viz. 212, the ſteam which ariſes from it, (where it is not confined,) muſt always be of that degree of heat. Now the internal parts of the earth, a few feet below the ſurface, being always both in winter and ſummer of 48 degrees of heat; it follows, that if the ſteam of water, after it is condenſed, flows through a given diſtance of the cold earth; it will become cool'd from 212 to ſome degree of heat above 48, proportional to the diſtance between the mountain, in which it is condenſed, and the place of its exit. And thus may for many ages preſerve an uniformity of the degree of heat; which could not happen if it was produced by chemical combinations of materials near the ſurface of the earth.

2. In the very dry ſummer of 1780, when all the cold ſprings in this part of the country either totally ceaſed, or were much diminiſhed; I was well inform'd on the ſpot both at Mat-

lock and Buxton, that the warm ſprings had ſuffer'd no obſervable decreaſe of their water. Whence I conclude, that the ſources of theſe warm ſprings were at a much greater depth beneath the ſurface of the earth than the cold ones: and that on that acconnt the water muſt firſt have been raiſed in the form of ſteam from thoſe greater depths.

Another circumſtance ſhews, that the ſource of many of theſe waters is ſituated beneath the origin of the cold ſprings; even after the ſteam, which produces them, is condenſed into water; which is that their heat continues always the ſame both in winter and ſummer, in wet ſeaſons and in dry, which evinces, that no cold water from the dews, or ſprings in conſequence of them, is mix'd with theſe ſources of warm water.

Indeed one of the ſprings at Matlock had much common cold water mix'd with it, lower down in its courſe towards the Derwent, which occaſioned it to be neglected; till a miner, Mr. Mather, propoſed laſt year to Mr. Simpſon, the proprietor, an ingenious deviſe to ſeparate them; which was by fixing pipes into the mouth of the ſpring to raiſe the hot water, before its exit, above the place, where the cold ſprings enter into it; and thus to puſh back the cold water into an old mine-ſough, where it was ſaid formerly to diſcharge itſelf; and thus by looſing a part of the warm water, to preſerve the remainder unmix'd; which I believe has ſo far ſucceeded.

3. The rocks of limeſtone in all this part of the country abound with perpendicular clefts, in which are found the ores of zinc, lead, and copper. And it is hence probable, that not only the ſteam of water *at preſent*, (which produces theſe warm ſprings,) but that thoſe metals themſelves, and the fluor or baro-ſelenite, which attends them, have in *former ages* been raiſed into thoſe perpendicular clefts by the great ſubterraneous fires, which raiſed the continents and iſlands from the primeval ocean.

4. The exiſtence of central fires in the earth in the early ages of the world is demonſtrated by the elevation of the ſolid parts of the globe above the ocean; and the ſhatter'd condition of its ſtrata; with the immenſe maſſes of lava then produced; which go under the names of toadſtone, baſaltes, moor-ſtone, porhpory, and granite, as are ſo well explain'd in Mr. Whitehurſt's, and in Dr. Hutton's theories of the earth. The preſent exiſtence of central fires ſeems probable from the many volcanoes, which are ſpiracula, or chimneys, belonging to thoſe great fires; and it is probable, that by

the eſcape of elaſtic vapours from theſe is owing the ſmall extent of modern earthquakes, compared with thoſe of remote antiquity, of which the veſtiges remain all over the globe. Another argument for the preſent exiſtence of immenſe ſubterraneous fires, is that the great earthquake at Liſbon produced undulations on the lakes of Scotland; and was felt in the mines of Derbyſhire: (Philoſ. Tranſact.) which could not eaſily happen, but by a percuſſion on one ſide of a confined fluid lava; which would be propagated to the other, as ſtriking the gentleſt blow on one ſide of a bladder diſtended with water is felt by the hand placed on the other ſide. To which may be added, that in ſome mines, the deeper you deſcend the warmer you perceive them. Morinus in a tract de locis ſubterraneis, p. 131. ſays, that in ſome mines of Hungary, which are 500 cubits deep, the heat becomes troubleſome, when the miners get below 480 feet of depth. And Monſ. De Luc, on going 1359 feet perpendicular into the mines of Hartz on July 5, 1778, on a very fine day, found the air at the bottom a little warmer than at the top of the ſhaft. (Phil. Tranſ.)

5. Becauſe there are ſprings of hot water in all countries, where open volcanoes evidently exiſt: whence from analogy we may conclude the hot ſprings in countries where open volca-

noes have exiſted, but are now not open, are owing to the ſame cauſe acting in a leſs powerful manner.

6. Add to this, that if thoſe waters had been heated by the chemical decompoſition of pyrites, ſome of them at leaſt would probably have retain'd a ſtrong chalybeate taſte, or ſulphureous ſmell: or that they would all of them have been impregnated with ſome ſimilar material; which on the chemical analyſes of theſe waters of Buxton, and Matlock does not appear to be the fact.

7. I come now to another circumſtance, which very much corroborates the above theory of the production of theſe ſprings from the ſteam raiſed from deep ſubterraneous fires, and not from the decompoſition of pyrites. The ſtrata of the earth in this part of Derbyſhire conſiſt of beds of limeſtone and of lava (or toadſtone) which lie reciprocally one upon the other; in many parts of the country, there are three beds of each, which are many yards thick. See Whitehurſt's theory of the earth. Now if we ſuppoſe the ſteam riſing from ſubterraneous fires to be owing partly to water ſlowly ſubſiding upon thoſe fires, and to limeſtone gradually calcined by them; it muſt happen, that the ſteam riſing through the perpendicular clefts in the ſupercumbent rocks muſt

be replete with calcareous gas, (or fix'd air;) with ſome phlogiſticated air.

Dr. PRIESTLY from 5 ounces of limeſtone obtain'd 1160 ounce-meaſures of air, nine tenths of which was fix'd air, and the other tenth phlogiſticated air. From 4 ounces of white ſpar he obtain'd 830 ounce-meaſures of air, the firſt portion of which had but one fourth of fix'd air; which however varied in the courſe of the experiment, being once three fourths, then one half, then one third of fix'd air. *Vol.* 6. *p.* 226.

If this ſteam ſo impregnated be condenſed in limeſtone ſtrata, the fix'd air in this hot ſteam will ſuper-ſaturate itſelf again with calcareous earth. Now this is what preciſely happens to the waters at Matlock, which are replete with calcareous particles; as appears by the copious depoſition of tupha, or calcareous incruſtations, along the channels in which they flow. For in general it happens, that ſprings of water wear themſelves valleys from their ſources, as is done by the water at Buxton; but thoſe ſprings at Matlock have produced rocks and mountains of a ſponge-like calcareous ſtone between their fountains and the Derwent, with which all the houſes at Matlock are conſtructed, and many of the ſtone fences.

It may ſeem extraordinary, that fix'd air, or calcareous gas, which is known to precipitate lime from water, ſhould render limeſtone more ſoluble in water. This however is evinced by the experiments of Mr. Cavendiſh, who added to lime-water, which had been render'd turbid by means of calcareous gas, more of the ſame gas: which enabled the water to rediſſolve the precipitated limeſtone. Which however is conſentaneous to other chemical phenomena, as one portion of alcali added to a ſolution of iron in an acid precipitates the iron; which is rediſſolved by the addition of a greater portion of alcali. Water by a large quantity of calcareous gas will thus in cloſe veſſels ſuper-ſaturate itſelf with lime; which will gradually precipitate in the form of limeſtone, when expoſed to the air, by the evaporation of the ſuperfluous gas.

In the beginning of October 1780, I was preſent with my friend Mr. Edgeworth at the opening of two of the ſprings of Matlock about 200 yards above their uſual places of appearance. We found them both at theſe new openings about one degree of heat, or ſomewhat more, warmer than at the places of their uſual exit. The upper one, which could be beſt ſeen, iſſued from ſome cracks or fiſſures in the upper ſurface of a bed of toadſtone, and between it and the blue marle, which lies over it; under which marle it ſeems to have been condenſed; and thence to have ſuper-ſaturated itſelf with calcareous particles. I examined this marle by means of acids, and found it to be calcareous; except ſome ſhining bits of whitiſh pyrites, which had no appearance of being in a ſtate of decompoſition.

On the contrary the ſteam, which produces the water of Buxton, is probably condenſed in the ſubſtance of the toadſtone or lava; and not in a ſtratum of marle or limeſtone, like the Matlock water; and hence the great difference of their contents. As one edge of theſe ſtrata of limeſtone and lava, wherever there are ſprings, is always elevated higher than the other; it would be eaſy by attending to the inclination of theſe ſtrata to diſcover, on which ſide of the bath is ſituated the mountain, in which the ſteam is condenſed; which probably may not be more than a mile or two from the eruption of the ſprings; becauſe in opening the ſprings at Matlock at a place about 200 yards above the wells, the water, (tho' already collected into a kind of vein) was cool'd more than a degree; and this cooling muſt proceed much faſter, where the water is diffuſely and thinly ſpread between two contiguous ſtrata. And further as the progreſs of this water muſt warm in ſome degree the ſurface of the earth, beneath which it paſſes after its condenſation; and particularly at the place of its condenſation; it is not improbable, but its courſe might be detected by obſervations made in rimy mornings, or when ſnow has lain long on the ground, by the melting or diſappearance of it firſt in that part; or perhaps by the earlier vegetation of the graſs or treees on thoſe parts of the ſurface. A Mr. Taylor, who once kept this bath, produced early vegetables by conveying a ſtream of the warm water under a border of his garden. If this ſource ſhould ever be diſcover'd by mining, I ſuppoſe the water by being received nearer the place of its devaporation, would be found of a greater degree of heat from 82, its preſent heat, up to 212, or the heat of boiling water.

I cannot conclude this part of the ſubject without obſerving the analogy between the production of cold and of hot ſprings; they are both produced from vapour; that, which produces cold ſprings, is brought to the ſummits of mountains by the atmoſphere; and being there devaporated ſlides down between the ſtrata, which compoſe the hill; and burſt out through ſome of theſe ſtrata below. That, which forms hot ſprings, is condenſed under the ſame ſtrata of the mountains, over which ſlides the cold water devaporated from the atmoſphere; in theſe reſpects exactly imitating, if large things may be compared with ſmall, an old-faſhion'd alembic, and its ſuperincumbent refrigeratory. Without the exiſtence of mountains, or elevations of ground, neither hot nor cold ſprings could have exiſted; nor indeed without their having been ſhatter'd in their elevation; for ſome of the ſtrata of the earth being deficient at the ſummits of mountains gives acceſs to the dews to ſlide between the firſt and ſecond; or between the ſecond and third ſtrata; and thus form cold ſprings below. And the perpendicular clefts or cracks in theſe mountains give acceſs to the ſteams raiſed from below for the production of warm ſprings.

The contents of the waters of Buxton and Matlock much countenance the theory above deliver'd, for if ſteam be raiſed from ſubterraneous furnaces, where limeſtone is probably in a ſtate of calcination, much calcareous gas (or fix'd air,) and ſome phlogiſticated air, would ariſe with the aqueous ſteam; theſe are found in the Buxton water in the looſe ſtate of bubbles, according to the analyſis of Doctor Pearſon, and in this the Buxton water reſembles the waters at Bath; which are ſaid by Dr. Prieſtly to poſſeſs ſimilar kinds of air. Exp. v. 2. p. 223. And as theſe airs ſeem to be the principal ingredients of both theſe waters, there is reaſon to believe, both from this circumſtance, and from their ſucceſs in relieving ſimilar diſeaſes, that their medicinal powers are very ſimilar. At the ſame time, as the waters at Bath are ſaid to contain a very minute quantity of iron, thoſe of Buxton may be better adapted to ſome inflammatory habits; and as there is a chalybeate ſpring at Buxton near the other, it would be eaſy occaſionally to render theſe waters ſtill more ſimilar to thoſe of Bath by adding a ſmall portion of the chalybeate water to that of Saint Ann's well at the time of drinking it; and thus doing that by art at Buxton which at Bath is done by nature.

In the Buxton water the fix'd air is found in looſe bubbles, becauſe it does not meet with any calcareous earth, or limeſtone to combine itſelf with: in the Matlock water the contrary occurs; it has no looſe air-bubbles, becauſe the fixable air is combined with lime; and thus this water is replete with calcareous earth in ſubtile ſolution; and in this reſpect, I ſuppoſe, reſembles the Briſtol water.

The incruſtations, which are depoſited from theſe calcareous or hard waters, were once ſuppoſed to contribute to produce the gravel or ſtone in the kidneys and bladder; this opinion particularly prevail'd about half a century ago in Paris; where it was ſaid, that a certain diſtrict of that city, ſupplied with water which incruſted the pipes, through which it paſs'd, was much afflicted with the ſtone in the bladder. Monſ. Condamine, an ingenious and active philoſopher, on a minute inquiry found the aſſertion to be totally devoid of truth. Since that time the waters of Carleſbad, which incruſt whatever is thrown into them like thoſe of Matlock, have been much frequented by patients with gravel and ſtone, and it is ſaid with advantage. (Philoſ. Tranſact.) Since the great light thrown on this ſubject by the chemical accuracy of Bergman and Scheele (whoſe premature deaths are a loſs to mankind,) the uſe of theſe waters may be better underſtood. By their experiments it appears, that the ſtony concretions in animal bodies conſiſt of ſaccharine acid and air, and that this acid has a greater affinity than any other to calcareous earth. Now as the ſaccharine acid is perpetually generated in the ſtomach during the digeſtion of our aliment; it is probable, the ſalutary effects of theſe calcareous waters, ſuch as Matlock and Briſtol, may be owing to their ſaturating the ſuperabundancy of this ſaccharine acid; and that thus they may prevent the tendency which ſome of our fluid ſecretions poſſeſs, of producing calculous, and perhaps gouty and bilious concretions;

cretions; and prevent the increaſe in ſize of thoſe already form'd. On the ſame principle they may tend to render purulent matter leſs acrimonious; as they are ſuppoſed to be of advantage in pulmonary and ſcrophulous ulcers. Certain I am, that the cold ſprings alſo, which are replete with calcareous matter, as St. Alkmund's and other wells about Derby, are ſalubrious to the drinkers of them; as the daily experience of the inhabitants who uſe them, evinces. And I am acquainted with one perſon, who has drank of a cold ſpring very much loaded with this kind of earth for his only potation for the laſt five years, uſing about two pints a day of it; and enjoy'd a perfect ſtate of health.

There is another diſeaſe in which the waters of Matlock and of Briſtol are celebrated, the diabætes. In this ſo great a quantity of ſugar is generated by the powers of digeſtion, that the urine becomes loaded with ſugar. A patient of this kind in the infirmary at Stafford, who eat and drank about thrice the quantity allow'd to other patients, made about 16 and ſometimes 18 pints of water a day; and by my deſire ſome of this was evaporated by Mr. Hughes of that place, and produced about an ounce of very coarſe ſugar from every pint of the water. An account of this caſe; and a theory of diabætes is publiſhed in a pamphlet "on the inverted motions of the lymphatic ſyſtem and a criterion between Pus and Mucus." Cadel, London. In this diſeaſe therefore it is probable the uſe of theſe calcareous waters is to be aſcribed to their affinity to the ſaccharine acid, which in thoſe caſes would ſeem to be in great abundance.

So far have I perform'd my promiſe to you in writing down, what has occur'd to me concerning the natural hiſtory of the waters of Buxton and Matlock: to enter minutely into the medical hiſtory of theſe, and of Kedleſton water, and other mineral waters of this county would require a volume, and take up much more of my time and attention than I could at preſent contrive to beſtow upon it. But I cannot leave this account of calcareous or hard waters without adding; that I ſuppoſe, from the great affinity between calcareous earth and ſaccharine acid, may be explain'd a circumſtance, the theory of which has never been underſtood, and therefore the fact has generally been doubted; and that is, that hard waters make ſtronger beer than ſoft ones. I appeal to the Brewers of Burton for the fact, who have the ſoft water of the Trent running on one ſide of their Brewhouſes; and yet prefer univerſally the hard or calcareous water ſupplied by their pumps. I ſuppoſe there may be ſome ſaccharine acid in the malt, (which is not all of it equally perfectly made into ſugar by the vegetable digeſtive power of the germinating barley,) which by its attracting the calcareous earth of hard waters may produce a kind of mineral ſugar; which like the true ſugar may be convertible into ſpirit: for a ſimilar purpoſe, I ſuppoſe, lime is uſed by the ſugar-bakers in refining their ſugars, tho' the theory of its effects is unknown to them.

There are other ſources of water in Derbyſhire, which ſhould be mention'd. The waters of the Hamps and Manifold ſink into the earth near Wetton mill, and riſe again in Ilam gardens. The ſubterraneous cavities, in which theſe ſtreams paſs, ſeem to have been made in the early ages of the world, (as well as all the other caverns of this county, as Peak-hole, Elden-hole, Pool's hole, and Thor's houſe near Wetton mill,) by long regions of earth riſing to let out the confined vapours from conceal'd volcanoes; and opening, as it were, their jaws; which, when the ſides ſubſided again, did not exactly fit each other; and thus left long ſubterraneous cavities.

The ſulphur waters of Kedleſton are celebrated for curing the ſame diſeaſes as thoſe of Harrogate, but are conſiderably weaker; and may therefore be better adapted to feeble conſtitutions. Theſe ſulphur-wells abound with marine ſalt, and contain ſome epſom ſalt; to which they all of them owe their purgative qualities. I am well inform'd, that the ſalt ſprings in Cheſhire, if they are left to reſt a few weeks without being pump'd, acquire a ſimilar ſulphureous ſmell; and ſuſpect, that theſe ſulphur wells may be claſs'd with other ſalt ſprings, of greater or leſs degree of ſaturation; but that ſome of their ingredients are in a ſtate of decompoſition.

The Biſhop of Llandaff, (to whom the public is ſo much obliged for making chemiſtry both uſeful and agreeable) mentions in his ingenious obſervations on Harrogate waters, that one of the ſprings ariſes in a bed of ſhale; ſome parts of which are ſofter than other parts, as if in a ſtate of decompoſition; about a mile eaſtward of the Kedleſton bath is a ſtratum of ſhale, which is ſeen on the ſides of the hollow way in Quarndon town; and, where it is there expoſed to the air, ſeems of a ſoft kind. Whence there is reaſon to ſuſpect, that the water being previouſly impregnated with vitriolic acid from ſhale may be neceſſary to the production of theſe ſulphureous waters. The Kedleſton water is weaker than that of Harrogate in reſpect to the quantity of marine ſalt it contains; I ſuppoſe about two ounces of Bay ſalt added to a gallon of this water renders it in every reſpect as efficacious as the Harrogate water, in thoſe diſeaſes commonly term'd ſcorbutic, and in worm-caſes, particularly aſcarides.

At Heage there is a water, I am inform'd, with a very auſtere taſte, which is worth inquiry; as it is probably either a chalybeate diſſolved in vitriolic acid, like that at Somerſham near Cambridge; or an aluminous water, like that of Nevil-Holt in Leiceſterſhire. Theſe ſprings, which abound with vitriolic acid, ſometimes produce moraſſes, which have a remarkable property of preſerving fleſh-meat; I have been told there are ſuch moraſſes in the wilds of the Peak; in which dead game, and even large pieces of mutton have been buried one year, and found nearly unchanged the next. In countries abounding with coals there are generally chalybeate ſprings; of theſe thoſe, which ſooner looſe their iron when expoſed to the air, are generally prefer'd for medical purpoſes; of this kind is that of Quarndon near Kedleſton; in theſe waters the iron is diſſolved by means of calcareous gas, or fix'd air as ſhewn by Mr. Lane; which is a volatile acid, and when expoſed to the air ſoon eſcapes; and the iron is then depoſited in a calciform ſtate like ochre. A dark-colour'd ſhale, of ſimilar appearance to that ſeen on the ſides of the hollow road near the chalybeate ſpring at Quarndon, covers the collieries at Bedworth near Coventry. There is a ſimilar ſhale alſo appears on the ſides of the turnpike road at Hulland near Aſhburn; it is probable there are coals under both theſe parts of the country, which from their ſituations would be valuable acquiſitions; and boring for coals, if properly managed, is not very expenſive; as the ſuperincumbent ſtrata are generally of ſoft materials.

I ſhall conclude this long letter by mentioning an artificial ſpring of water, which I produced by boring near the Derwent in Full-ſtreet in Derby.—As the copious ſpring, call'd St. Alkmund's well, riſes about half a mile from this part of Full-ſtreet, and about ſix feet higher in reſpect to level; I ſuppoſed the ſame ſtratum of marle might be continued to this place, tho' cover'd with houſes, and ſome feet of rubbiſh. On clearing an old well, which was about four yards deep, and contain'd very bad water, the upper ſurface of the marle appear'd. The old well was then wall'd round with bricks, and water-clay, ſo that the bottom was kept perfectly dry. A hole about two inches diameter was then bored about 15 yards deeper: and then ſome ſand was brought up mix'd with the marle; and a ſpring gradually aroſe; and by driving a wooden pipe into the hole, and afterwards putting a leaden pipe through this, the water aroſe about two feet above the ſurface, tho' not up to the level of St. Alkmund's well, as I had expected; it has now for five years continued to flow; and I think rather increaſes in quantity, and perhaps in purity. A more particular account of this well is related in the Philoſophical Tranſactions.

I mention it in this letter, becauſe I ſuppoſe there are many ſituations in which water might be thus procured by boring a perpendicular hole near the edges of valleys, or a horizontal one into the ſides of mountains, for the convenience of watering cattle or for flooding grounds, and for the purpoſes of agriculture. And I ſuppoſe the ſprings in marly countries are preferable to river-water, as they are always loaded with calcareous earth.

If you think any part of this long letter worthy a place in your expected hiſtory of Derbyſhire, I deſire you will do with it whatever is agreeable to you.

I am, dear ſir,
With great reſpect, &c.
E. DARWIN.

SECT. I.

Rivers.

AS rivers are formed by the confluence of ſprings and ſmall ſtreams of water, it will be proper to take notice of thoſe of Derbyſhire in this place. Now the largeſt of theſe are the Trent, the Derwent, the Dove, the Wye, the Errewaſh, and the Rother.

The ſource of the Trent is not in this county, but in the park at Trentham, the ſeat of the Marquis of Stafford. It enters into Derbyſhire at the ſouth-weſt extremity, and winding its courſe acroſs interſects it into two unequal parts. Flowing through a flat and level country it paſſes along with a deep and gentle ſtream. Milton, in one of his occaſional poems, thus deſcribes this river.

> Trent, who like ſome earth-born giant ſpreads
> His thirty arms along the indented meads,
> Or ſullen mole, that runneth underneath.

About ſixty years ago, the Trent was rendered navigable as high as the town of Burton. In conſequence of this improvement conſiderable buſineſs began to be done upon it. And it was calculated, that the goods carried down it every year amounted to about fourteen thouſand tons. But at a later period this quantity was rendered much larger by the communication, which was opened between the eaſtern and weſtern coaſts of this kingdom by means of a navigable canal.

There are three bridges thrown over the Trent in its courſe thro' the county. They have all been built ſince the Norman conqueſt. For in Domeſday book no mention is made of a paſſage over it, excepting at Weſton.

Burton Bridge, which is the firſt, erected over the Trent, after it enters Derbyſhire, was built in the time, when Bernard was Abbot of Burton, which was ſometime in the interval between the years 1157 and 1175.

Swarkeſtone bridge, I apprehend, was built at a much later period. I have not been able to aſcertain the particular time. There is a tradition in the neighbouring country, that this undertaking was executed at the expence of two maiden ladies. But ſuch an account appears ſcarcely credible, when the great length of the bridge is duly conſidered. It is ſaid to conſiſt of 29 arches at various diſtances from each other, and appears to extend above three quarters of a mile.

Cavendiſh bridge was built about 30 years ago, at the expence of the family, whoſe name it bears. Formerly there was a ferry at this place, and the charge for paſſing the bridge is continued the ſame, as for croſſing the water in the old way.

There is a ferry both at Willington and Twiford. At the latter village the river is fordable in two different places.

The river Derwent riſes in the northern extremity of the county, and taking a ſouthern courſe falls into the Trent a few miles below the town of Derby. The whole length of its courſe is about 46 miles. Running thro' a hilly country, its current is ſwift and rapid. Whether this circumſtance has any effect upon the temperature of its water, it ſeems not eaſy to determine. But it is an undoubted fact, that this is much warmer than the generality of rivers. I have been informed, that in the ſummer ſeaſon the thermometer frequently ſtands at 66 degrees. It was likewiſe obſerved, in the year 1740 the Derwent was not ſo ſoon frozen over as the Trent, and that after the commencement of the thaw it became navigable nearly a month earlier than that river. Nor will it appear difficult to account for this fact without aſcribing it to the rapid motion of its water. Flowing thro' a country, abounding with warm ſprings, it muſt receive a conſiderable body of water from them in its courſe.

The Dove likewiſe has its ſource in the high peak. Running in a ſouth-eaſt direction it divides this county from Staffordſhire, and falls into the Trent, at a ſmall diſtance below Burton.

The river Wye riſes a little way above Buxton, and, running in a ſouth-eaſt direction, falls into the Derwent at Rowſley, a few miles below Bakewell.

The Errewaſh riſing in the hundred of Scarſdale, and, ſeparating the two counties of Derby and Nottingham from each other, falls into the Trent at a ſmall diſtance below Sawley.

The river Rother has its ſource near Cheſterfield, and, taking a north-eaſt direction, falls into Yorkſhire near the village of Beighton.

SECT. II.

Navigable canals.

I Mention the navigable canals in this connection, though they can ſcarcely with ſtrict propriety be regarded as forming a part of the natural hiſtory of Derbyſhire.

Several years ago an act of parliament was obtained with a view of opening a communication between the eaſtern and weſtern coaſts of this kingdom by means of a navigable canal. This deſign has been ſome time completed, and one extremity of the canal has been brought into Derbyſhire. It enters into the county at a place called Monk's bridge, where it is carried over the river Dove in an aqueduct of twenty-three arches, and the ground is raiſed one mile and two furlongs in length, and to a conſiderable height. The canal is 31 feet wide at the top, 18 at the bottom, and five and a half deep. Its whole length in Derbyſhire is about 14 miles, and in its courſe thro' the county it has 6 locks upon it. The boats employed upon it carry about 25 tons, and are drawn by horſes. The tonnage is three-halfpence, and the freight one penny per mile. It is now about 18 years ſince the extremity, which lies in Derbyſhire was completed, and during this time the ſhares have varied conſiderably in their value. At preſent they ſell at their original price.

A ſecond canal has been formed in the north-eaſt part of the county. It begins at Cheſterfield, and extending eaſtward thro' part of Yorkſhire and Nottinghamſhire, falls into the Humber at Stockwith in the latter county. The part which lies in Derbyſhire was finiſhed in the year 1777, and on the fourth of June a veſſel was brought to the town of Cheſterfield. It extends from hence 11½ miles in this county, and enters into Nottinghamſhire at a place called Gander-lane.

When the act of parliament was obtained for making this canal a large ſum was ſubſcribed, but found inadequate to the execution of this deſign. The original ſubſcribers were therefore obliged to take up money for this purpoſe; and ſince that time have had the mortification to find, that the profits, ariſing from the buſineſs done upon the canal, have been merely ſufficient to pay intereſt for their loan.

A third canal, called the Errewaſh canal, extends along the eaſtern borders of the county. It begins near Langley mill, in the pariſh of Heanor, and running nearly parallel with the river Erewaſh, falls into the Derwent a little below Sawley. Its whole length is about 11 miles. There are 14 locks, and 25 bridges upon it; and at the head it is 108 feet higher, than at the place, where it falls into the river.

In April 1777, the bill for making this canal received the royal aſſent; in about four months afterwards it was begun; in November 1778 it was completed as far as the firſt colliery at Ilkeſton, and on the 10th of December 1779 it was wholly finiſhed. This day the firſt boat came up, the whole length of the canal, from the river Trent to Langley-mill. It was filled with proprietors agents and workmen, and attended with a band of muſic; and, as it paſſed each bridge, and coal wharf, it ſaluted with ſmall cannon and muſquetry. The concourſe of people on the occaſion was very numerous.

The expence, incurred by the execution of this undertaking, was about 25,000l. From May 1784 to May 1785 the tonnage amounted to above 4000l. and, when all neceſſary deductions were made, above 3000l. remained to proprietors for intereſt. The ſhares are now riſen to three times their original value.

There has lately been in agitation a ſcheme for extending this canal northwards as far as Pinxton-mill. But I have not heard what is the ultimate determination of the proprietors and landholders in the neighbourhood.

CHAP. VII.

Soil, agriculture, and produce.

IT may be juſtly queſtioned, whether there be any art of ſo much importance to the welfare of mankind, as that of agriculture. Upon the cultivation of it the comfort, if not the exiſtence of ſociety manifeſtly depends. For this reaſon an attention has been paid to it in every period of the world. There is ſcarcely an age or nation, in which its great moment has not been in ſome meaſure perceived and acknowledged. Yet it appears from hiſtory, that the improvements, which have been made in this buſineſs have not born a due proportion to its importance. I pretend not fully to account for this fact. But it is evident that there are ſome points in the ſtudy of agriculture, which have not yet met with a proper degree of attention. The nature of ſoils and manures has not been examined with that care and accuracy, which ſeems neceſſary for the improvement of this uſeful branch of knowledge. However from the great ardour and ſucceſs, with which the ſtudy of chemiſtry has been lately purſued, it may be hoped, that the period is not very diſtant, when the conſtituent parts of both theſe ſubſtances will be more clearly aſcertained, the fertilizing principle be better underſtood, and the buſineſs of agriculture be eſtabliſhed upon a more certain foundation, than has hitherto been the caſe. According to the preſent management no very great advantages are to be expected from the proſecution of it, unleſs a perſon has paid a long and cloſe attention to the external characters of ſoils, and to the effects of thoſe manures, with which they are uſually improved. Whereas by a proper analyſis they may be adapted with greater certainty to each other, and young diſciples in the art will proceed upon more clear and ſettled principles, and therefore ſooner acquire a clear knowledge of this fundamental part of agriculture.

In deſcribing the ſoil of Derbyſhire I wiſh it was in my power to give an accurate account of the various kinds, which are found in different parts of the county. To do this many and repeated experiments are evidently neceſſary. But as theſe require much time and conſiderable ſkill and practice in chemical analyſis, the information I have been able to obtain in this way is very ſlight and ſuperficial. In the account, which I ſhall now give, I ſhall therefore do very little more than deſcribe the different kinds of ſoil by their external characters and appearance.

The moſt common ſoil in Derbyſhire is a reddiſh clay or marl. I have already mentioned* a very large diſtrict in the county, in which very little or no ſtone of any kind is diſcovered below the ſurface of the ground. Now wherever this is the caſe, I believe, the ſoil is of the nature, which I have now deſcribed. A reddiſh clay or marl appears alſo throughout the ſouthern and middle part of that extenſive tract of limeſtone, which has been obſerved to lie on the north-weſt ſide of the county.

In reſpect to the quality of this ſoil I would remark, that it is exceedingly various in different ſituations. In ſome places it contains ſo much calcareous earth, that with a few drops of vitriol a ſtrong effervеſcence will be produced. Whereas in others this acid ſeems not to have the leaſt effect upon it. Such a difference is frequently obſervable in different layers even in the ſame ſituation.———— In regard to the colouring principle of this ſoil, there is little or no doubt, that it is iron. This, I believe, is the general opinion of chemiſts, and in ſupport of it I have found, that water, when it has paſſed through it, has been ſo

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ſo much impregnated with this metal, as to ſtrike a faint purple with gall-ſhavings.

An excellent compoſt is often formed by the Derbyſhire farmers of lime, dung, and the ſoil of which I am ſpeaking. The laſt is alſo uſed alone as a manure. It is the moſt uſeful, when it is of a calcareous nature. However I have been informed, that light and boggy land has been improved ſometimes by the argillaceous kind.

A very different ſpecies of ſoil prevails throughout that large tract of country, in which coal is found. It is a clay of various colours. It is in different places, black, grey, brown, and yellow, but principally the laſt. I have not learnt, that it any where contains ſo much calcareous earth, as to effervеſce upon the addition of vitriolic acid. However in ſome places a conſiderable quantity of ſand ſeems to be mixed with it.

This kind of ſoil is alſo found in ſome parts of Derbyſhire, where gritſtone is met with. But in ſuch a ſituation the land is more frequently of a black colour and bituminous quality. On the eaſt moor, and in the northern extremity of the county, there are large tracts of land, which conſiſt of this ſort of ſoil.

In regard to the ſoil, with which the limeſtone on the north-eaſt ſide of the county is covered, I believe, it is generally of a brown colour, but of different ſhades. As far as my obſervations have extended, it appears to be of a looſer texture, and to produce a finer graſs than the ſoil, under which coal or gritſtone is found.

In the ſhort account I have now given of the different kinds of ſoil, which are met with in various parts of Derbyſhire, I wiſh it not to be underſtood, that any of them uniformly prevail thro' the ſeveral diſtricts, which have been deſcribed. In ſome ſituations tracts of land of a conſiderable extent may be obſerved of a quality, very different from that, which is ſeen throughout the neighbouring country. This diverſity ſeems in ſome inſtances to be owing to adventitious cauſes. In that part of the county, in which coal is found, this more eſpecially is the caſe. Where the faults occur, I am told there is generally a change in the appearance of the ground at the ſurface.

It is alſo obſervable, that in thoſe parts of the country, in which the reddiſh clay and marl are found, land of the extent of 50 or 200 acres, and of a blackiſh colour and looſe texture is ſometimes met with. It is generally ſeen in moiſt ſituations, and perhaps may be thus accounted for. It is not improbable, that it was originally of the ſame nature with the ſoil in the neighbourhood, but that the iron, which it contains, being moiſtened by the liquid, flowing from aſtringent plants, with which wet places abound, it would be changed to the black colour, by which it is diſtinguiſhed.

Small tracts of gravel and ſandy ſoil are alſo interſperſed throughout the diſtrict, of which I am ſpeaking. But I confeſs myſelf incapable of aſſigning any reaſon for their appearance in ſuch a ſituation.

Nor am I more able to account for the origin of thoſe peat bogs, which are found in the north part of the county. Many theories have been formed for this purpoſe. But I have met with none, which appear to me entirely ſatisfactory. It has been ſuppoſed, that they have been occaſioned by trees falling down and periſhing; that theſe have ſtopped the currents of water, and by them have been converted into a bog. But this does not ſeem to have been the caſe in Derbyſhire. For in the bogs, formed upon the higheſt mountains, trees have been found nearly perfect. In one, which is ſituated upon Hatherſage moor, near Stanwich Pole, I am informed, that at the depth of two yards oak, birch, and firs have been diſcovered in leaf. From the various ſubſtances, of which the earth of theſe bogs is found by analyſis to conſiſt, it ſeems not improbable, that it has an animal or vegetable origin. Perhaps it may have both.

The ſoil in the vallies, near the banks of the larger rivers, is, every where, of a different nature from that in the neighbouring country. It is eaſy to ſee, that its original ſtate muſt be much altered by the various kinds of earth, with which it is mixed, whenever it is overflowed by the ſwelling of the water. Such inundations ſerve in ſome degree, though not entirely to account for the diverſity of ſoil, which is obſervable in the ſituations of which I am now ſpeaking. Whether the great fertility of the land in ſuch places can be juſtly aſcribed to the ſame cauſe, I leave to be determined by thoſe, who have better opportunities of enquiry and obſervation.

Having given an account of the general nature of the ſoil in Derbyſhire, I proceed to deſcribe as well as I am able, in what kind of occupation and ſtate of improvement the land is throughout the county.

In the ſouthern part of Derbyſhire the land is nearly equally divided betwixt paſture and tillage. Formerly in the neighbourhood of Appleby it was employed chiefly in the latter way. But, about 20 years ago, the open fields were encloſed, and ſince that time the buſineſs of the dairy has been more attended to.

At Walton upon Trent the land is occupied in the ſame manner; but the farms are larger. It is not uncommon in this part of the county for one perſon to have five hundred acres in his hands and cultivation. As the dairy is equally an object of attention with the growth of corn, the ſame land is never ſuffered to continue long in tillage. The following courſe of huſbandry is moſt common.

After breaking up the graſs land, it is cuſtomary to ſow

Oats,	Oats,	Oats,	Oats,
Wheat,	Wheat,	Wheat,	Wheat,
Barley,	Fallow,	Fallow,	Beans,
or	Turnips,	Wheat,	Fallow,
	Barley,	Barley,	Barley.

Sometimes after oats and wheat they fallow in the winter, and then have a crop of barley or beans. But, I believe, it is an univerſal practice, when the laſt crop is taken, to ſow graſs ſeeds, which are either clover or rye graſs or both. It is uſual, after having completed the above courſes, to ſuffer the land to lie two or three years for paſture.

However this kind of management is not extended to all their lands. Some are never broken up. This is more eſpecially the caſe with thoſe which lie near the banks of the Trent. Theſe are conſtantly kept for paſture; becauſe it is thought, that better cheeſe is produced by the natural than the cultivated graſſes.

About 14 years ago the double furrowed plough was introduced into the ſouthern part of Derbyſhire. It is now almoſt univerſally adopted; and the long experience and approbation of the beſt farmers may be juſtly conſidered as bearing a ſtrong teſtimony to the excellence and great utility of this implement of huſbandry. The wheel plough is alſo uſed in a few inſtances.

At Greaſley and Repton great attention has been paid to the cultivation of barley. Theſe pariſhes lying in the neighbourhood of Burton, the farmers have been much encouraged in the growth of this ſort of grain by the great conſumption of malt at the breweries of that town.

The land near the banks of the river Dove is not ſo much in tillage, as that in the more ſouthern part of the county. At Eggington and Scrapton the dairies are in general very large; upon ſome of the farms forty or fifty milking cows are kept. Beſides wheat barley and oats, a ſmall quantity of rye is grown. But in theſe and all the other pariſhes, which extend along the banks of the Dove, the farmers raiſe their rents chiefly from an attention to their dairies.

The land, which lies betwixt this part of the county, and the town of Derby is more equally divided betwixt tillage and paſture. The ſoil being ſtrong is thought to be better adapted to the growth of wheat, oats, and beans, than barley. When the ground is laid down to paſture, it is uſually ſown with clover and rye graſs, to which a little trefoil is ſometimes added. At Sutton on the Hill, and Church Broughton, the wheel and double furrowed ploughs are both in uſe, but the former is going out of repute. The land is ſaid to be too ſtrong for it.

At Brailsford, where the ſoil is rather lighter, barley is ſown almoſt equally with wheat and oats. Of theſe two crops are generally taken from a fallow, and afterwards one of turnips alſo. It is eſteemed the beſt management not to ſuffer the land to remain long either in tillage, or paſture without a change.

In the neighbourhood of Aſhbourn the buſineſs of the dairy is principally attended to. Very little grain beſides oats is grown here.

The land about Derby, which is employed for the growth of moſt ſorts of grain, is more eſpecially valued for the excellent wheat, which it produces. No finer crops are gathered in any part of the county, than at Chaddeſden and Chelaſton. In the fields at both theſe places, which are open and extenſive, the following courſe of tillage and crops is invariably purſued. Fallow, wheat, barley, beans or peaſe. This management, I believe, is alſo common in other places where land in tillage has not been yet encloſed.

At Weſton upon Trent three crops are generally taken from a fallow, when the land is conſtantly in tillage. The uſual courſe is barley, clover, and wheat. The ground is moſtly prepared with a wheel plough drawn by two horſes, going abreaſt.

At Mugginton, on the oppoſite ſide of Derby, the land in tillage is managed ſomewhat differently. But, in this and the neighbouring pariſhes, the growth of corn is only a ſecondary object of attention. The principal ſtreſs is laid upon the produce of the dairy. Accordingly the beſt land is chiefly in paſture.

In all that tract of country on the north ſide of Trent, which I have now deſcribed, the farms are in general of a very eligible extent. Upon an average they are let at about a hundred pounds a year. Tho' the rent of a few may amount to the double of this ſum, yet, I believe, the generality are rather below it.

Proceeding northward on the eaſt ſide of the county we may obſerve a great change in the ſtate and method of agriculture and the nature of the produce. We ſee the land in paſture continually diminiſhing, and a larger proportion aſſigned to tillage than in any other part of the county.

At Heanor the uſual courſe of crops after a fallow are

Turnips,		Wheat,
Barley,		Oats, and
Oats,	or	Graſs ſeed.
Clover,		
Wheat.		

The graſs ſeeds which are ſown here, are Dutch clover, rye graſs, trefoile and rib graſs.

A large proportion of the land at Ripley is in paſture. The tenants are uſually reſtrained in their leaſes from ploughing more than a third of the land in their occupation. In regard to that, which is in tillage, the two courſes of crops, which are moſt common after a fallow, are,

Upon ſtiff land	*Upon light land*
Wheat,	Turnips,
Oats,	Barley and clover,
Oats,	Wheat,
Fallow again, or ſow clover and rye graſs.	Oats.

In the ſecond courſe it is uſual to manure the clover leys with dung or lime. If this is omitted, a good crop of oats is not to be expected.

When the farmers intend that the land ſhould reſt ſome time, they ſow it with clover and rye graſs and take a crop of hay. After this they ſuffer it to lie ſome years for paſture. When they break the ground up again, they frequently pare and burn it. They ſeldom ſow Dutch clover, becauſe they ſay, it will not continue long in the ground.

At Pentridge in the neighbourhood of Ripley rib graſs is ſometimes ſown.

At Alfreton the following method of managing land in tillage is the moſt common upon a fallow prepared

With lime	With lime and dung.	Winter fallow with lime.
Wheat,	Turnips,	Peas,
Oats,	Barley,	Wheat,
Oats,	Clover,	Oats.
	Wheat,	
	Wheat, ſometimes.	

It is thought, that a crop of peaſe, by killing the weeds, tend very much to prepare and improve the land for ſucceeding crops of other grain.

Tartarian Oats have lately been introduced into this part of Derbyſhire, and are likely to prove uſeful and profitable. Seven or eight quarters generally ariſe from an acre of poor land.

Bind has been laid here upon light land, and given it ſuch firmneſs and ſtrength, as to qualify it for producing a good crop of wheat.

At Bolſover the land is much in tillage. The number and courſe of crops are various.

Wheat,		Barley,
Oats,		Clover,
Clover,	or	Wheat,
Wheat,		Oats.
Oats,		

Agriculture at Barlborough ſeems to be faulty in almoſt every reſpect. The farms are too ſmall for a country, in which there is no manufacture, and from the great number of crops taken from a fallow, are in general in a very impoveriſhed ſtate. The following is the order, in which they commonly ſucceed one another; wheat, oats, clover, wheat. But they often run the fallows much longer.

The land at Norton and Dronfield is very much in tillage. The moſt common methods of taking crops after a fallow are

Turnips,

Turnips,	or	Wheat,	Wheat,
Barley and Clover,		Clov. or peas	Oats,
Wheat,		Wheat,	Oats,
Oats,		Oats,	
When the land is good in nature or condition.			When in bad condition.

The fallows are often worked with the ſpiky or porcupine roller. When the ſoil is a ſtiff clay, and has not much graſs upon it, it is a very uſeful implement. After the ground is a little broken down by it, it is cuſtomary to go over it a few times, firſt with a great, and then with a ſmall harrow.

The following experiment made with a view of trying the effect of urine ſeems to be deſerving of attention. The Rev. Mr. Halliday of Norton, manured three equal parcels of land in the following manner. One he covered with dung, and another with aſhes, but the third he watered with urine. The reſult was, that the laſt produced an equal quantity of hay with the other two.

Mr. Shore, who pays great attention to improvements in huſbandry, is very careful to preſerve the urine from his cattle. He collects it in a reſervoir ſunk in the ground at a ſmall diſtance from his ſtables. When this is filled, the urine is pumped into a hogſhead, fixed upon a pair of wheels in the ſame manner with the watering carts in London. It is then carried into the fields, and ſprinkled upon the ground by means of a ſmall trough full of holes, which is faſtened behind the veſſel, and receives the urine when it is let out by a plug drawn for that purpoſe.

Returning ſouthward to the Midland part of the county, we may obſerve conſiderable improvements begun and carrying on at the ſouth extremity of the eaſt moor, Theſe are two very extenſive encloſures in the pariſhes of Matlock and Aſhover, including ſeveral thouſand acres. The fences are made with ſtone, in ſome places collected from the ſurface of the ground, and in other taken out of pits opened for that purpoſe. When I was in this part of the county, the encloſure was only lately begun. No juſt opinion could therefore be formed concerning the value of the land, or the crops, which they were likely to produce. I remarked, that the method of preparing the land for tillage, was paring and burning it and manuring it afterwards with lime.

At Brackenfield and Higham the land is a good deal in tillage. The grain chiefly grown is wheat and oats.

At Higham the following courſes of crops are the moſt common after a fallow.

Upon poor land	*On good ſtrong land.*	*Upon very good land.*
Clover & oats.	Clover and barley,	Turnips,
Wheat upon clover leys.	Wheat on clover leys.	Barley and clover,
		Wheat upon clover leys.

As the ſoil lies thin upon the rock, it is not uſual to take more than two crops from a fallow. Amongſt the graſs ſeed ſown at Higham, cinquefoile has been tried with ſucceſs. It yields not only a very good crop, but is alſo found very durable in the ground. The method of tilling land, which I have mentioned as practiſed at Weſton upon Trent, has been adopted in this part of the county likewiſe.

If we paſs from hence into the wapentake of Wirkſworth, we ſhall find, that grazing and the buſineſs of the dairy are leading objects of attention throughout all this diſtrict.

At Bradbourn and Hartington a very ſmall quantity of corn is grown. In the latter pariſh there is a very extenſive common, which apparently is ſuſceptible of very great improvement. The ſoil in moſt places ſeems to be good, and is covered with a fine turf. The greateſt hindrances to improvement are the coldneſs of the climate and a ſcarcity of ſuitable manure. The quantity of dung is but ſmall, which can be ſpared from the land, already encloſed and cultivated. However there is not the leaſt doubt, but that with the aſſiſtance of the lime, and other kinds of manure, which the country affords very important advantages might be derived from the encloſure of a common, the natural ſoil of which appears to be ſo good.

In the high Peak the farmers raiſe their rent chiefly by grazing and breeding of cattle. At Chelmorton and Stoney Middleton a conſiderable number is every year fattened, and diſpoſed of at Mancheſter and Sheffield Markets. Peak foreſt, and ſome other parts of the neighbouring country are employed in taking young cattle to ley. Large herds are brought from Cheſhire and Yorkſhire in the ſpring, and fetched back about the end of October.

In the pariſh of Gloſſop the land is chiefly in paſture. The farms are in general but ſmall and well adapted to this manufacturing part of the county. In many inſtances the produce is only ſufficient to ſupply the wants of the family of the perſon, by whom they are occupied. On ſome of the larger farms the breeding of cattle for ſale is an object of conſiderable importance.

portance. But in this and moſt other parts of the high Peak a very ſmall quantity of corn, beſides black oats, is grown. Perhaps the pariſhes of Hope, Edenſor, and Darley may be in ſome degree regarded as exceptions to this remark. In theſe three places I believe a larger proportion of wheat and barley is cultivated than in any other part of the neighbouring country.

From the ſhort and general ſketch, which has been given of the agriculture and produce of Derbyſhire it is manifeſt, that a larger proportion of land is applied to the purpoſes of the dairy and grazing, than to the growth of corn. This is much more the caſe now, than it has formerly been. Several hundred acres in different parts of the county are laid down for paſture, which were ſome years ago in tillage. Accordingly it is found, that the quantity of cheeſe, which the county produces, is more than ſufficient to ſupply the wants of its inhabitants. It is calculated, that nearly two thouſand tons are every year carried to London, and ſeveral ſea-port towns on the eaſt coaſt. The cheeſe of Derbyſhire is generally mild, and in taſte, tho' not always in colour greatly reſembles that, which is made in Glouceſterſhire.

In regard to the corn, which is grown in Derbyſhire, it is generally ſuppoſed by dealers in this article, that of ſome kinds a larger, and of other a ſmaller quantity is produced than what is ſufficient to ſupply the inhabitants. It is certain, that there is no ſort of grain ſo much cultivated as barley. The produce is ſo large, that about half of it, which is calculated to be about 5000 quarters annually, is carried into, and conſumed in the counties of Stafford, Cheſter, and Lancaſter. In the two laſt it is diſpoſed of in the ſtate of malt. But beſides this, a conſiderable quantity of barley is ſold in the markets of Burton and Uttoxeter. It is calculated, that upon an average about 500 or 600 quarters are brought annually from Nottinghamſhire and Leiceſterſhire into the town of Derby in particular, and that about two-thirds of the barley, which is here converted into malt, is diſpoſed of in the neighbouring weſtern counties.

There is reaſon to believe, that the produce of wheat in the county is ſcarcely equal to the conſumption. When the crops have failed, it has been found neceſſary to procure a ſupply from Nottinghamſhire and Lincolnſhire. Sometimes a ſmall quantity has alſo been brought in from Norfolk.

In reſpect to the articles of beans and oats it is ſuppoſed, that in Derbyſhire there is cultivated about a ſufficient quantity for the uſe of the inhabitants.

From the ſurvey, which has been taken of the agriculture and produce of the county, it appears, that ſome parts of it do not yield corn in ſufficient quantity for their conſumption. The inhabitants of the Peak are obliged to have recourſe to the markets of Cheſterfield and Alfreton for a ſupply. It has been computed by thoſe, who are competent judges of the matter, that theſe high and mountainous ſituations do not produce more than a fourth part of the grain, which is conſumed there.

I doubt not, but that thoſe, who are properly acquainted with the ſtate of agriculture and the nature of the produce of many other counties in this kingdom will eaſily perceive, that ſeveral modern improvements have not yet been introduced into Derbyſhire. Perhaps it may not be unacceptable to ſome of thoſe, into whoſe hands this work may fall, to be informed of a few particulars, in which the Derbyſhire huſbandry ſeems to be defective, when compared with that practiſed in Norfolk and Suffolk, and other counties, diſtinguiſhed by their judicious management of land in tillage.

In Derbyſhire the ſeed of turnips is univerſally ſown broad-caſt, and in many places the uſe of the hoe is either unknown or entirely neglected. If we attend to the management univerſally prevalent in Norfolk and Suffolk, we ſhall eaſily ſee, that this branch of buſineſs will admit of great improvement. In theſe counties they ſow with an engine, which from its conſtruction appears to be poſſeſſed of ſeveral advantages. It is generally 12 feet long, and has four ſides, which in width are not quite equal to one another. The bottom is an inch and half wide, the two ſides an inch and three quarters, and the top, which is a ſlide, about the eighth of an inch wider than the ſides. The inſide conſiſts of eighteen equal diviſions or boxes, and in the bottom of each is a ſmall orifice inlaid with tin, thro' which a hole is bored, juſt large enough to allow a few ſeeds to paſs at one time.——With this engine turnip ſeed may be ſown more even, and with greater expedition, than in the broadcaſt way. The perſon, by whom it is carried and uſed, regulates the motion of it by the pace, with which he walks. If he takes large ſteps, he ſwings it twice acroſs his path every time he moves his foot; but if his ſteps are ſhort, he gives only a ſingle motion of his arms to each.

When the plants appear, the farmers are very careful to leſſen their number, firſt by drawing a light harrow over them, and afterwards by uſing the hoe two and occaſionally three times. Nor is there any room to doubt, that ſuch a practice would be productive of very good effects, if it was univerſally adopted into the huſbandry of Derbyſhire. Indeed the experience of ſome, who make uſe of the hoe, with themſelves puts the matter out of diſpute. They are ready to acknowledge, that by this means they not only obtain a larger crop of turnips, but alſo bring the land into a more improved and fertile ſtate for producing ſucceeding crops.

The neceſſity of hoeing turnips has been clearly ſhewn by Mr. Young § in his addreſs to the farmers in the weſt of England. He ſays. that in Suffolk without hoeing they would get a produce on their beſt lands of, perhaps, two, three, or at moſt four tons an acre, and that chiefly leaf. With hoeing, they get from twenty to thirty-five tons of root only; and if leaf were an object, much more than is ever gained without. He obſerves alſo, that hoeing deſtroys all weeds, which may have riſen in the field from the laſt ploughing. Another argument, which he brings in ſupport of the culture of turnips is, that it covers the land, in the hotteſt ſeaſon of the year, from the action of the ſun, which, he imagines, volatilizes and exhales thoſe finer particles on which depend, or with which is connected, the

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§ Papers of the Bath ſociety, vol. 3. page 314.

the food of plants. He adds, that many weeds may rather be propagated than killed by the turnip huſbandry without hoeing. He is inclined to think, that if the ploughings be given in a quick ſucceſſion, the roots and ſeeds will be tumbled about too faſt for vegetation, but when the land is ſown and left to repoſe, they will grow very faſt.

Another implement of huſbandry uſed in Norfolk and Suffolk and a few other counties in England, but which I have never ſeen or heard of in Derbyſhire is the dibble or frame dab. To introduce the farmers of this county to a knowledge of it, I ſhall therefore attempt to give a deſcription of its form and uſe. It is of three different conſtructions and applied to the ſame number of purpoſes. The dibble, which is made uſe of for planting peaſe, is three feet long, and has ten teeth, the two outſide ones of which are ſquare. The length of the ſtem or handle, which is inſerted in the middle of the frame is about the ſame with that of the frame itſelf. Another kind, which is uſed for ſetting beans, a good deal reſembles that, which I have now deſcribed, excepting in the number of teeth, which is only ſix. A third ſort of dibble, which is uſed for planting wheat, is not materially different in ſize or form from either of the foregoing. The only reſpect, in which it diſagrees is, that it contains twelve teeth.

The number of hands required to follow the dibble depends upon the ſort of grain which is ſown. That uſed for planting wheat, which contains the moſt teeth, I am informed, will require eight children at the leaſt to follow it. This account I received, when I was in Suffolk a few years ago. But I am informed that the frame now in uſe in ſome part of the county has only ſeven tines or teeth.

The practice of ſetting wheat is now become very extenſive in Norfolk and Suffolk, and has been in ſome degree adopted by other counties. And when it is conſidered, how many advantages ariſe from ſuch a cuſtom, it will not appear difficult to account for the approbation, which it has already met with. Six ſhillings are given for ſetting an acre, and ſo expert are the labourers in the buſineſs, that they will earn nearly five ſhillings a day. Sometimes women as well as men with the help of children perform this work; and the poor derive ſo much advantage from this employment, that they can diſcharge their rents and maintain their families without having recourſe to the pariſh.

Nor does the farmer receive leſs benefit from ſetting of wheat. The produce is two ſhillings per acre more than from that, which is ſown. Having much leſs ſmall corn intermixt with it, the ſample is better, and always fetches a higher price, to the amount generally of two ſhillings per quarter. Add to this, that the value of the ſeed, which is ſaved, is ſufficient to defray the expence of planting.

From theſe obſervations it alſo follows, that the public muſt be greatly benefited by ſuch a practice. Many thouſands are ſupported by the corn, which would have periſhed in the earth, if it had never been invented and applied to the purpoſes of agriculture.

Several of the conſiderations, which have been brought to ſhew the great utility of ſetting wheat, might be employed to recommend the uſe of the dibble for planting beans and peaſe. But this is a point too obvious to ſtand in need of any enlargement. I therefore proceed to make a few remarks upon the ploughs, employed by the farmers in Derbyſhire.

It appears from the obſervations, which have been made, that the wheel and double furrowed ploughs have been ſome time introduced into ſome parts of the county. But ſtrong prejudices are ſtill entertained againſt them in other ſituations. It is objected againſt the Norfolk * plough, that it is not adapted to the ſtiff lands of Derbyſhire, and that, when drawn by two horſes going abreaſt, the ridges are apt to be trodden down and injured in ground, either naturally moiſt, or rendered ſo by wet ſeaſons. In regard to the double furrowed plough it is alledged, that in fields, which have been long in tillage, the lands or ridges are very much twiſted, and where this is the caſe, it cannot be uſed without difficulty and inconvenience. However it is acknowledged, that, where the ridges lie in a direct line, with the addition of one horſe as much work may be done in a day, as with two ſingle furrowed ploughs in the ſame ſpace of time.

Perhaps the following courſe of crops, as they are much practiſed in Norfolk and Suffolk, may not be unworthy of the attention of farmers in thoſe parts of Derbyſhire, in which the land is chiefly in tillage.

Upon a good clay ſoil.		*Without ever fallowing.*
Fallow,		
Barley,		Turnip,
Clover,	or	Barley,
Wheat,		Clover,
Beans,		Wheat.
Barley,		

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* Perhaps it might with ſtricter Propriety be ſtiled the Saxon plough; for it appears to have been uſed in England before the Norman conqueſt. Mr. Strut in his chronicle of theſe times has given a drawing of a wheel plough, which was then in uſe.

Upon a lighter land,

Fallow or turnips,		Fallow,
Barley,	or	Wheat,
Clover,		Clover,
Wheat.		Wheat.

In many parts of Suffolk ſo great ſtreſs is laid upon the third of theſe courſes, that it frequently forms an article in leaſes.

In regard to the management of land employed for paſture, it is obſervable, that ſome of the artificial graſſes and plants, cultivated with great ſucceſs in other counties, have never been introduced into Derbyſhire. I have not heard, that ſantfoin, cole-ſeed, lucern or the turnip-rooted cabbage have been tried in a ſingle inſtance. If from the repeated experiments of farmers in different parts of the kingdom an opinion may be formed of the advantages, ariſing from the cultivation of the laſt of theſe plants, it ſeems to be highly deſerving of attention. It is very likely, that this vegetable production will prove more valuable than any other, with which we are acquainted. Its chief excellency ariſes from being a green and moſt nouriſhing food at a ſeaſon of the year, when it is moſt wanted. It will live throughout moſt winters, without receiving any Injury. It is alſo produced in larger quantity than the common turnip, and is very acceptable food for horſes as well as cows and ſheep. It is cultivated and treated in the ſame way, with the common turnip.

Beſides the turnip-rooted cabbage, there are ſeveral other kinds of food for cattle either not known or not attended to by the farmers in Derbyſhire, but at the ſame time highly worthy of cultivation. But I forbear to enumerate and enlarge upon them, leſt I ſhould digreſs too much from the main object of this work.

SECTION.

Animals.

IN the account, which has been given of the ſtate of agriculture in Derbyſhire, I have omitted to take notice of the different ſorts of cattle, which are commonly bred and kept in the county, reſerving this branch of huſbandry, till I came to enumerate the various kinds of quadrupeds, which are found in this part of the kingdom.

Horſes.

There is ſcarcely any characteriſtic, by which this animal can be diſtinguiſhed in Derbyſhire. The horſes, which are employed in agriculture, and for hard labour, are conſiderably different in the ſouthern and northern parts of the county. Thoſe kept in the ſouth are in general of a ſtrong and heavy kind. Whereas in the northern part of Derbyſhire the horſes are ſmaller, and more light and ſlender, and on account of their make are better adapted to the buſineſs of a mountainous country. As a large quantity of limeſtone is burnt in the Peak, they are much employed in carrying this article to diſtant places thro' roads, ſome of which are ſcarcely paſſable with wheel carriages. It is ſurprizing to obſerve, with what agility and eaſe they will riſe and deſcend the ſteepeſt hills, with very large burdens upon their backs.

Nor is the like extraordinary effect of cuſtom and habit leſs conſpicuous in the horſes, which are uſed for the ſaddle. In purſuing the diverſion of hunting they will run full ſpeed along the ſide of, or directly down the ſteepeſt declivities. It is ſaid, that thoſe, which have been long uſed to the country, will aſcend any precipice, which can be climbed by man.

Horned cattle.

The cows of Derbyſhire are almoſt univerſally horned, rather large and handſome. Their horns are well ſhaped, near the head falling outward, but at the extremity turning towards the noſe. Their ſize is various. They weigh from nine to fourteen ſtones a quarter. The moſt common weight is ten or eleven.

Several gentlemen have lately taken conſiderable pains to improve the breed of cattle in this county. And it may be juſtly queſtioned, whether any other diſtrict in England of the ſame extent can furniſh ſo large a number of cows, equally diſtinguiſhed by their beautiful ſhape. In proof of their great value and excellence ſome have been ſold at ſo high a price as 100l. each.

However it ſeems, that they are not formed merely to pleaſe the eye. It is ſaid, that they may be made fat in a much ſhorter time, than thoſe, which are brought from other counties. But it does not appear, that they are better calculated for the ſupport of the dairy. Tho' they give from two to four gallons at a time; yet, I am informed, that they do not often exceed ten quarts.

Tho' a large number of cattle be annually bred in this county, yet it is ſuppoſed, that they are not ſufficient for the uſe of the inhabitants. Many are brought every year from Yorkſhire and Lancaſhire, and ſold to the graziers who reſide in different parts of Derbyſhire.

Sheep.

Sheep in the northern and ſouthern part of Derbyſhire are in weight and ſize conſiderably different from each other. Thoſe, which are bred upon the borders of Leiceſterſhire weigh from 20 to 30 pounds a quarter, and the farmers are conſtantly endeavouring to encreaſe their ſize. In the middle part of the county they are ſomewhat ſmaller. But in the high Peak their weight is ſtill more diminiſhed. The ſheep, which are kept here in great number, weigh from 14 to 17 pounds a quarter, thoſe upon gritſtone being 3 pounds lighter, than thoſe upon limeſtone land. But the difference in the quantity and quality of the wool is ſtill more remarkable. The fleeces, which grow upon the gritſtone ſheep are much lighter and thinner than thoſe, which are taken from the other kind. Whether this difference be owing to the quality of the food or to the particular breed of the animal, I am not myſelf able to determine. Perhaps both cauſes may have ſome degree of influence.

Goats.

There are now very few if any goats kept in Derbyſhire, though they were once nearly as much attended to as any of the ſpecies of animals, which have now been mentioned. Among the endowments of Beauchief abbey recited in a charter of Henry 4th we meet with a grant of paſture land for 40 cows and 2 bulls, 10 mares, 80 ſheep, 30 ſwine, and 40 goats. From ſo large a proportion of goats it may be preſumed, that they were at that time very numerous and common in this part of the kingdom.

Swine.

It appears, that in the reign of king John there were ſwine living wild in Derbyſhire. For at that time a grant was made to the monaſtery at Lenton of tithe of the game taken in the counties of Nottingham and Derby, namely of ſtags and hinds, of bucks and does, and of boars and ſows. ‡

At preſent there are three different ſorts of ſwine in this county. Some are very large, weighing between 40 and 50 ſtones. Their heads are very long, and their ears hanging over their eyes, and extending almoſt to their noſe, give them a very ugly and diſagreeable appearance. There is alſo a ſmaller ſort with ſhort ears pointing directly upwards. But the moſt common ſwine are a mixture of theſe two breeds, and weigh about 25 ſtones each. They are uſually fattened with either potatoes, peaſe or oats. But the laſt are thought to have the moſt ſpeedy effect. It is cuſtomary to begin with boiled potatoes, and to finiſh with oatmeal or peaſe.

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‡ Mon. Angl. vol. 1. page 648.

Deer.

Though in nature there be a conſiderable variety of theſe animals, yet, I belive, the fallow deer are the only ſpecies now to be met with in Derbyſhire. They may be ſeen in very great number in the parks at Chatſworth and Kedleſton.

However we have ſeen, that ſtags were once common in this county.† The horns of this animal, which are yet remaining in the halls of the moſt ancient houſes afford alſo undoubted evidence of the fact: and as an additional confirmation of it I would obſerve, that they have been found in the cliffs of rocks in the Peak. I have ſeen a ſtag's head in the poſſeſſion of the Rev. Mr. Barker of Youlegrave, which was found in the tophus at Alport. One of the horns is perfect, and the ſuture of the ſkull may be clearly diſcerned. At what particular period this ſpecies of deer was exterminated in Derbyſhire I have not been able to aſcertain. But it may be preſumed, that as there are very few ſtags to be met with in Great Britain, the diſtance of time, at which they became extinct, is conſiderable.

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† Note, page 315.

In regard to the wild and leſs uſeful animals I believe they are the ſame in Derbyſhire as thoſe, which are found in other parts of England. There is one ſpecies now become extinct, which ſeem to have been once common in the northern extremity of the county. For it appears, that the high Peak was formerly much infeſted by wolves. John le Wolfehunt, who died 2 Edw. II. held one meſſuage and 15 acres of land by the ſervice of taking wolves in the foreſt of the king in the Peak of Derbyſhire.

Foxes are met with in every part of the county, but in the greateſt number at Bradley and Shirley park in the neighbourhood of Aſhbourn. It is ſaid, that cats are ſometimes ſeen in woods in a wild ſtate and that they are larger and more fierce than the tame ones. I have been favoured with a few particulars reſpecting the otter, which are curious, and deſerving of notice; as they throw ſome degree of new light upon the capacity and diſpoſition of this animal. A few years ago one was brought up tame at Eckington. Upon enquiry the Rev. Mr. Pegge informed me, that he ſaw it twice, or three times, once in the water, where it caught a good large eel, and ſwam about ſome time with the fiſh in its mouth. He alſo ſaid that it was as tame and as harmleſs as a lap dog, and would come when called.

It is ſcarcely neceſſary to add, that polecats, martins, weaſels, badgers and ſtoats, hares, rabbits, ſquirrels and dormice are all inhabitants of Derbyſhire. Of rats there are very few of the black ſpecies. But the brown and water rats are common, eſpecially the former. Houſe and field mice are likewiſe often met with. Moreover the fetid and water ſhrew, the mole, the urchin and the great and the long eared bat are all common in Derbyſhire.

CHAP. VIII.

A catalogue of ſome plants growing ſpontaneouſly in Derbyſhire.

IN the laſt chapter an account was given of the ſoil, agriculture, and produce of Derbyſhire. In this ſurvey notice was taken of ſome of the moſt uſeful plants, which are cultivated in different parts of the county. But very few of thoſe, which grow ſpontaneouſly, were enumerated. I therefore propoſe now to give as complete a catalogue, as I have been able to form, of the plants which come under this denomination.

Perhaps ſuch an attempt may be thought ſuperfluous and unneceſſary. It may be alledged, that ſeveral works have already been undertaken expreſſly for the purpoſe of aſcertaining the native plants of Britain. But ſuch a buſineſs is not the ſole or chief object, which I have in view. Indeed I have no expectation of adding to the number of plants, which have already been obſerved in this kingdom. My principal intention is to point out the ſituation, in which any individual one may be found in Derbyſhire.

The execution of ſuch a deſign, I doubt not, will be thought uſeful by thoſe, who have a taſte for botanical purſuits, and reſide in the county. But ſuch perſons may poſſibly object to a catalogue of the more common plants. They may think it ſufficient to take notice of thoſe, which are ſcarce in this part of the kingdom. But on the other hand let it be remarked, that ſo confined a plan would have rendered this branch of natural hiſtory very defective. Another reaſon for attempting a general catalogue is the great difficulty of diſtinguiſhing what are really ſcarce plants. For ſome, which are ſeldom met with in one ſituation, grow very plentifully in another.

I ſhall not attempt a deſcription of any of thoſe plants, which I propoſe to enumerate. This buſineſs more properly belongs to the botaniſt than the natural hiſtorian. Beſides, to give an account of the generic and ſpecific characters of plants would ſwell this work to an inconvenient ſize. It will be more conducive to the end, which I have in view, and perhaps equally amuſing and inſtructive to mention their medical virtues, their uſes in the arts, and as food, and any other ſtriking or peculiar properties, of which they may be poſſeſſed. In executing this part of my plan I have derived conſiderable aſſiſtance from the botanical arrangement of Britiſh plants by Dr. Withering. He has collected from other authors, and obſerved himſelf whatever is uſeful and amuſing on the ſeveral ſubjects, which have now been mentioned. He has alſo been ſo kind as to offer me, thro' the obliging medium of Mr. Whately, any extracts, which I might think worthy of my attention. And it will be ſeen, that I have not neglected to avail myſelf of his polite offer.

In reſpect to the arrangement of the plants, which appear in the following catalogue, I have adopted thoſe of Mr. Hudſon and Dr. Withering, ſo far as they were conſiſtent with the execution of the plan, which I had formed.

The catalogue, which I now preſent to the public, is not ſo large as I could wiſh. Many plants are omitted, which, I doubt not, are frequently obſerved in ſeveral parts of the county. But as they have not been examined by myſelf, or thoſe gentlemen, who have been ſo obliging as to give their aſſiſtance, I have thought proper not to mention them.

The particular places of growth of what I apprehend to be the rarer plants are pointed out. The name of the perſon, by whom they have been obſerved, is alſo frequently added: and conſiderable pains have been taken to render this part of the work as accurate as poſſible.

I have given both the Linnæan and Engliſh names of plants for the convenience of the unlearned as well as ſcientific botaniſt; and, after the example of Dr. Withering, the former has been placed the firſt.

Whenever the time of flowering and the length of a plant's duration in the ground are known, they are both noticed. The letter A. ſignifies annual, or one year. B. biennial, or two years. P. perennial, or many years. It may be proper alſo to obſerve, that with a view of diſtinguiſhing the ſhrubs, and trees from other plants, they are marked with the letters T. and S.

Claſs I.

MONANDRIA *DIGYNIA.*

I. CHIVE. II. POINTALS.

CALLITRICHE *verna.* *Water ſtarwort. Water fennel. Star-headed water chickweed.* Frequent in wet ſituations.

A. March—Auguſt.

Claſs II.

DIANDRIA *MONOGYNIA.*

II. CHIVES. I. POINTAL.

LIGUSTRUM *vulgare.* *Common privet.* Common in hedges about Derby and Pinxton.

S. May. June.

The berries are filled with a dry, ſpongy, violet, pulp, from which a roſe-coloured pigment may be prepared. Scopoli.

With the addition of allum, the berries dye wool and ſilk of a good and durable green; for this purpoſe they muſt be gathered as ſoon as they are ripe—the leaves are bitter and ſlightly aſtringent.—Oxen, goats, and ſheep eat it; horſes refuſe it.

VERONICA *officinalis.* *Common ſpeedwell. Male ſpeedwell.* Pinxton, Derby, and Kedleſton park. P. May. June.

The leaves have a ſlight degree of aſtringency and bitterneſs. An infuſion of them is recommended by Hoffman, as a ſubſtitute for tea; but it is more aſtringent and leſs grateful.

It is ſaid to be uſeful in purifying the blood and humours.

It is eaten by cows, ſheep, goats, and horſes, but refuſed by ſwine.

VERONICA *ſerpyllifolia.* *Pauls betony. Smooth ſpeedwell.* Derby; Pinxton; in meadows and paſtures. P. May.

VERONICA *beccabunga.* *Brooklime.*

Common in ſtreams of waters, and near ſprings. P. June.

The leaves are mild and ſucculent, and are eaten in ſallads early in the ſpring.

This is ſometimes uſed as an ingredient in ſpring-juices.—Cows, goats, and horſes eat it; ſwine refuſe it.

VERONICA *anagallis.* *Water ſpeedwell. Long-leaved brooklime. Water pimpernel.*

South Normanton. P. July. Aug.

VERONICA *ſcutellata.* *Narrow-leaved ſpeedwell.* Egginton heath. P. June.—Aug.

VERONICA *chamædrys.* *Wild germander.* Paſtures; ſides of hedges. South Normanton. Derby. P. May.

The leaves are a better ſubſtitute for tea than thoſe of the common ſpeedwell, being more grateful and leſs aſtringent. Cows and goats eat it; ſheep, horſes, and ſwine refuſe it.

VERONICA *agreſtis.* *Germander—Chickweed.* Derby. A. April.

Cows, goats, ſheep, and horſes eat it.

VERONICA *hederifolia.* *Small henbit.* *Ivy chickweed.* Hedge banks; ploughed fields, near Derby. A. April. May.

VERONICA *arvenſis.* *Wall Speedwell.* Old walls, and amongſt rubbiſh; Derby. A. May.

Horſes eat it.

PINGUICULA *vulgaris.* *Butterwort.* *Yorkſhire ſanicle.*

On moiſt and boggy ground, near Mr. Eames's, Mackworth. P. May.

It is ſaid, that new milk poured upon the freſh leaves in a ſtrainer and ſet by a day or two,

becomes

becomes ſtiff and tenacious; that it does not yield any whey, and ſoon is converted into a very pleaſant and wholeſome food. It has been alſo obſerved, that a ſmall quantity of the milk in this conſiſtent ſtate will have upon freſh milk the ſame effect, which is produced by the leaves of the plant. However, the truth of theſe aſſertions has lately been queſtioned. Upon trial it is not always found to be poſſeſſed of the property, which has now been mentioned.—The oily and glutinous juice, which ſanicle contains, is uſed by farmers to cure cracks or chops in the udders of cows.—It has been ſuppoſed by ſome, that it is the cauſe of the diſeaſe, called the rot, among ſheep, when by extreme hunger they have been conſtrained to eat it. But Dr. Withering queſtions, whether this complaint is owing ſo much to the vegetables in marſhy grounds, as to a flat inſect called a fluke, (faſciola hepatica) which is found in theſe wet ſituations adhering to the ſtones and plants, and likewiſe in the livers and biliary ducts of ſheep, which are affected by the rot.

From experiments made on purpoſe, and conducted with accuracy, it appears, that neither ſheep, cows, horſes, goats, or ſwine, will feed upon this plant.

LYCOPUS *europæus.* *Water horehound.* Derby, Pinxton, S. Normanton. P. July. Sept.

It dyes black. The juice gives a permanent colour to linen, wool, and ſilk. Travelling gypſies ſtain their faces with it.

SALVIA *pratenſis.* *Meadow Clary.*
Crich. Mr. Hallows. P. June.

CIRCÆA *lutetiana.* *Common Inchanters Nightſhade.* Newton wood; Sutton ſpring; Quarndon well; in the woods at Matlock.
P. May. Aug.

It is eaten by ſheep.

Order II.

DIGYNIA. II. POINTALS.

ANTHOXANTHUM *odoratum.* *Spring graſs.*
Meadows and paſtures common. P. May.

This is one of the earlieſt of our graſſes and is ſaid by Linnæus to occaſion the ſmell of new-mown hay. Mr. Curtis ſays that the leaves, rubbed between the fingers, impart a grateful odour. Boccone ſays a diſtilled water is perpared from it as the vehicle of ſome perfumes. Dr. Withering obſerves, if it be gathered whilſt in bloſſom, lapped in paper and carried in the pocket, it retains the ſmell of new-mown hay for a long time.

Claſs III.

TRIANDRIA *MONOGYNIA.*

III. CHIVES. I. POINTAL.

VALERIANA *officinalis.* *Great wild valerian.* Matlock; Duffield; Dovedale.

Cats are much affected by the roots. P. June.

There is a variety of this plant, with narrower leaves, growing in high ſituations. It is this, which is ſo much valued in medicine. The root has a ſtrong and not an agreeable ſmell; its taſte is warm, bitteriſh, and ſubacrid; it communicates its properties to wine, water, or ſpirit; but it is beſt in ſubſtance and may be taken from half a dram to two drams for a doſe. There is no doubt of its poſſeſſing antiſpaſmodic virtues in an eminent degree. It is often preſcribed with advantage in hyſterical caſes; and inſtances are not wanting when it appears to have removed ſome obſtinate epilepſies. In habitual coſtiveneſs it is an excellent medicine and frequently looſens the bowels when other ſtronger purgatives have been tried in vain.

VALERIANA *dioica.* *Small marſh valerian.* Moiſt meadows, Siddals. P. May. June.

VALERIANA *locuſta.* *Lamb's lettuce. Corn ſallad.*

Frequent in corn-fields. April.—July.

The young leaves in ſpring and autumn are eaten as ſallad, and are ſaid to be very little inferior to young lettuce.—Cows, ſheep, and lambs eat it.—A horſe eat it. Dr. Stokes.

CROCUS *officinalis.* *Autumnal ſaffron crocus.*

Holmes and Siddals near Derby; Breadſall and Duffield near the banks of the river Derwent. P. Sept. Oct.

The leaves of this plant, which grows in large patches in a common paſture near Derby, are preferred by the cattle to all other graſſes.

The ſummits of the pointal carefully collected, and moderately dried, are the ſaffron of the ſhops. That collected in England is preferred to all other. It affords a beautiful colour to water, wine, or ſpirit, and gives out the whole of its virtues to them. It has been holden in high repute as a cordial and exhilerant, and to be particularly ſerviceable in diſorders of the breaſt and in hyſteric depreſſions; but Dr. Withering ſays, that modern practice pays no great attention to it, ſince it has been found to produce no ſenſible effect, even when given in doſes much larger than thoſe generally preſcribed.

IRIS *pſeud-acorus.* *Yellow Iris.* *Flower de luce.* *Water flag.*

Swarkeſtone bridge; Packſaddle bridge near Markeaton; Tibſhelf; Pinxton; and other marſhy and wet ſituations. P. July.

The juice of the freſh root is very acrid and has been found to produce plentiful evacuations from the bowels, when other powerful means had failed. [*Edin. med. eſſ. Vol.* 5. *art.* 8.] It may be given for this purpoſe in doſes of 80 drops, every hour or two; but phyſicians find the degree of its acrimony is ſo uncertain, that it can ſcarcely ever come into general uſe. In ſome caſes it proves diuretic. Dr. Withering ſays, the freſh roots have been mixed with the food of ſwine bitten by a mad dog, and they eſcaped the diſeaſe, when others bitten by the ſame dog died raving mad. The root loſes moſt of its acrimony by being dried.

Goats eat the leaves when freſh; but cows, horſes, and ſwine refuſe them: cows will eat them when dried, The roots are uſed in the iſland of Jura to die black. *Pennant's tour,* 1772, *p.* 214.

SCIRPUS *paluſtris.* *Common club-ruſh.* *Aglet-headed ruſh.* Pinxton; betwixt Derby and Kedleſton. Auguſt.

ERIOPHORUM *polyſtachion.* *Cotton-graſs. Moor-graſs.* *Moſs-crops.* Bogs on the high moors; Quarndon common. P. June.

Poor people ſometimes ſtuff their pillows with the down, and make wicks of candles with it, but it becomes brittle when quite dry.

NARDUS *ſtricta.* *Matgraſs.* *Small Mat-weed.* On the moors. June.

This graſs is ſtiff and hard to the touch, but being generally ſhort, it eludes the ſtroke of the ſcythe, and takes off its edge, which makes it diſliked by mowers.

Goats and horſes eat it. Cows and ſheep are not very fond of it. Crows ſtock it up, for the ſake of the larva of inſects which they find at the root.

Order II.

DIGYNIA. *II. POINTALS.*

ALOPECURUS *pratenſis.* *Foxtail graſs.* Meadows, very common. P. May. June.

This is the beſt graſs to ſow in low meadow grounds, or in boggy places which have been drained. Sheep, horſes, and goats eat it. cows and ſwine are not fond of it. Linn. But Dr. Pultney ſays, that this is the moſt grateful of all graſſes to cattle.

ALOPECURUS *agreſtis.* *Field foxtail graſs.*
Common in field and road ſides.
P. July. Auguſt.

ALOPECURUS *geniculatus.* *Spiked float-graſs.* *Spiked water-graſs.*
On the road between Derby and Coxbench.

PHLEUM *pratenſe.* *Timothy graſs.*
In paſtures, very common. P. July.

Cows, horſes, and goats eat it. Swine refuſe it.—Dr. Pultney obſerves, that notwithſtanding the character which this graſs acquired from Le Rocques recommendation, ſheep diſlike it; neither are cows or horſes fond of it.—But Leers ſays, it affords an excellent paſture for Horſes.

PHALARIS *arundinacea.* *Reed Canary.*
Rivers; Breadſall. P. July. Aug.

It is uſed to thatch ricks or cottages and is ſaid to laſt much longer than ſtraw. In the province of Scandia they mow it twice a year, and their cattle eat it. Linn. It is of a hard texture and cattle are not fond of it. Schreb.

AGROSTIS *capillaris.* *Fine bent.*
Paſtures and road ſides, common. P. Aug.

AGROSTIS *tenuifolia.* Common.

AGROSTIS *canina.* *Brown bent.*
In a wood near Holbrook. P. July. Aug.
Cows and Horſes eat it.

BRIZA *media.* *Quaking-graſs.*
Common in meadows and paſtures. P. July.
Cows, ſheep, and goats eat it.

If a ſeed be carefully diſſected in a microſcope, with a fine lancet, the young plant will be found with its roots and leaves pretty perfectly formed. Dr. Withering.

POA *annua.* *Annual meadow graſs.*
Very common. April.—Sept.

DACTYLIS *glomerata.* *Rough cock's-foot graſs.* Very common. P. June. Aug.
Horſes, ſheep, and goats eat it. Swine refuſe it.

FESTUCA *fluitans.* *Flote graſs.*
Wet ditches and ponds. P. July.—Sept.

The ſeeds are ſmall but very ſweet and nouriſhing. They are collected in ſeveral parts of Poland and Germany, under the name of manna ſeeds and are eſteemed a delicacy in ſoups and gruel upon account of their nutritious quality, and grateful flavour. When ground to meal, they make bread very little inferior to that in common uſe from wheat. The bran ſeparated in preparing the meal, is given to horſes, which have the worms; but they muſt be kept from water for ſome hours afterwards. Geeſe are very fond of the ſeeds, and well know, where to look for them. Dr. With.

FESTUCA *ovina.* *Sheep's feſcue.* P. July.
In high ſituations. Duffield bank.

It flouriſhes beſt in a dry ſandy ſoil: cows, horſes, and goats will eat it, but it is the favourite food of ſheep: they prefer it before all other graſſes, and are ſaid ſooneſt to grow fat upon it; for tho' ſmall, it is ſucculent. The Tartars who lead a wandering life, tending their flocks and herds, always chooſe thoſe ſpots where this graſs abounds. Is not the ſuperiority of the Spaniſh and Engliſh wool owing to the abundance of this graſs in the hilly paſtures where the ſheep are kept? Dr. Withering.

FESTUCA *ſylvatica.* *Wood feſcue.*
Common in woods. P. July

AIRA *præcox.* *Early hair graſs.*
Near walls; not uncommon. A. May. June.

AIRA *flexuoſa*. *Heath hair-graſs.*
Common. P. July. Aug.
Horſes, cows, and ſheep eat it.

CYNOSURUS *criſtatus*. *Creſted dog's-tail graſs.* Common in paſtures. P. July. Aug.

BROMUS *giganteus*. *Tall brome-graſs.*
Common in woods and moiſt hedges.
P. July. Aug.
Cows, horſes, goats, and ſheep eat it.

BROMUS *ſterilis*. *Barren brome-graſs.*
Frequent in hedges. A. June. July.

BROMUS *hirſutus*. *Hairy brome-graſs.*
Common. May. June.

BROMUS *erectus*. *Upright brome-graſs.*
Not very common, but found in a wood near Little-Eaton. Dr. Johnſon. P. June.

AVENA *elatior*. *Tall oat-graſs.* Meadow, paſtures, and hollow-ways. Common. P. June.
Cows, ſheep, and goats eat it.

AVENA *pubeſcens*. *Rough oat-graſs.*
Common. P. June.

ARUNDO *arenaria.*
Common. Dr. Johnſon.

LOLIUM *perenne.* *Ray graſs.* *Rye graſs.*
Common. P. June.

It makes an excellent hay upon a dry chalkey or ſandy ſoils. It is cultivated with advantage along with clover, and ſprings earlier than the other graſſes; by this means cattle are ſupplied with food at a ſeaſon of the year, when it is moſt difficult to be obtained.

Cows, horſes, and ſheep eat it. Goats are not fond of it.

ELYMUS *europæus.* *Wood lime-graſs.*
Rocks oppoſite to Matlock—Baths. Mr. Woodward. P. June.

HORDEUM *pratenſe.* *Meadow barley.*
In the fields about Coxbench. P. June.

HORDEUM *murinum.* *Wall barley.* *Way Bennet.* *Wild rye.* *Rye-graſs.*
Common. A. April.—Aug.
Sheep and horſes eat it.

TRITICUM *repens.* *Squitch-graſs, Dogs-graſs, Couch-graſs, Quitch-graſs.*
P. June.—Aug.

It is a very troubleſome weed in moſt places. At Naples the roots are collected in large quantities, and ſold in the market to feed horſes. They have a ſweet taſte. When dried and ground to meal they have been made into bread in years of ſcarcity. The juice of them drank liberally is recommended by Boerhaave in obſtructions of the viſcera; particularly in caſes of ſchirrhous liver and jaundices. Dogs eat the leaves to excite vomiting.—Horſes eat them when young, but leave them, when fully grown.—Cows, ſheep, and goats eat them.

Order III.

TRIGYNIA. III. POINTALS.

MONTIA *fontana. Small water chickweed or purſlane.* A. May.
Pinxton, Wirkſworth, and Buxton.

Claſs IV.

TETRANDRIA *MONOGYNIA.*

IV. CHIVES. I. POINTAL.

DIPSACUS *pullonum*. *Wild teaſel*. B. July.

Hedges and ditches; very frequent for ſeveral miles round the town of Derby.

In ſome parts of England this plant is cultivated for the uſe of the clothiers, who employ the heads with crooked awns to raiſe the knaps upon woollen cloths. For this purpoſe they are fixed upon the circumference of a large broad wheel, and the cloth is held againſt them, when it is turned round.—The flowers bloſſom in June, and the heads are gathered in Auguſt.

DIPSACUS *piloſus*, *Small wild teaſel. Shepherd's rod. Shepherd's ſtaff.*

Derby; betwixt Derby and Spondon. Dr. Johnſon.

SCABIOSA *ſucciſa*. *Devil's-bit or ſcabious.*

Frequent in fields. P. June.—Aug.

Linnæus ſays, that the leaves are uſed to dye wool yellow or green.—Dr. Withering obſerves, that a ſtrong decoction of it, continued a good while together, was an empirical ſecret for gonorhœas.

SCABIOSA *arvenſis*. *Field or corn ſcabious.*
Paſtures and corn fields. P. July. Aug.

Sheep and goats eat it. Horſes and cows are not fond of it.—This plant is ſlightly aſtringent, bitter, and ſaponaceous.

SCABIOSA *columbaria*. *Small ſcabious.*
Frequent. P. June.—Aug.

Horſes, ſheep, and goats eat it.

PLANTAGO *major*. *Greater plantain or way-bread.* June.—Aug.

Common. Sheep, goats, and ſwine eat it; cows and horſes refuſe it.

Dr. Withering ſays, that the common people apply the green leaves to cuts.

PLANTAGO *media*. *Hoary plantain. Lambs-tongue.* P. June.—Aug.

Frequent. Sheep, goats, and ſwine eat it; cows and horſes refuſe it.

PLANTAGO *coronopus*. *Star of the Earth. Hartshorn.* A. June.—Aug.

On a ſandy bank near Swarkſton church.

PLANTAGO *lanceolata*. *Rib-graſs.*

Common, in fields and meadows. P. June.

Linnæus ſays it is eaten by horſes, ſheep, and goats, and that cows refuſe it; but Haller attributes the richneſs of the milk, in the famous Alpine dairies, to this plant and to the Alchemilla vulgaris. Dr. Withering.—The total abſence of this plant in marſhy lands, is a certain criterion of the wretched quality thereof. In proportion as ſuch ſoils are meliorated by draining, this plant will flouriſh and abound. It is often ſown and cultivated for paſturage, but does not anſwer the purpoſe without a mixture of clover or other graſſes. Twelve acres of land being ſown with this plant; a plentiful crop was the conſequence, but no animal would eat it. Mr. Dickenſon.—When it grows detached from other plants, as it frequently does by the ſides of foot-paths, I have never ſeen cattle touch it. Dr. With.

SANGUISORBA *officinalis.* *Wild or great Burnet.* P. June.

Common, in moiſt paſtures.

The whole plant is aſtringent. The green leaves are ſometimes put into wine to give it a grateful flavour, and the very young ſhoots are ſaid to be agreeable in ſallads. Linnæus ſays, that cows, horſes, ſheep and goats eat it.—But Mr. Woodward obſerves, that horſes do not ſeem fond of it.

SHERARDIA *arvenſis.* *Little field Madder.*

Common. A. May.—Sept.

Goats are very fond of it; horſes eat it; ſheep are indifferent to it.

ASPERULA *odorata.* *Sweet Woodroof.*

Sutton wood; Dovedale; in a wood near Mr. Eames's, Mackworth. P. May.

Linnæus obſerves, the ſcent of this plant is ſaid to drive away ticks and other inſects. Formerly it was much in repute for attenuating viſcid humours, and ſtrengthening the tone of the bowels, but it is rejected by modern practice. Dr. Withering obſerves, that it gives a grateful flavour to wine.

Cows, horſes, ſheep, and goats eat it.

ASPERULA *cynanchica.* *Squinancy-wort.*

Normanton; Pinxton. P. July.

GALIUM *paluſtre.* *White Ladies bed ſtraw.*

Common in marſhes about Coxbench. P. July

Cows, ſheep, and horſes eat it. Goats and ſwine refuſe it.

GALIUM *verum.* *Yellow Ladies bed ſtraw. Cheeſe Rening. Petty Muguet.* P. July. Aug.

Sides of fields and roads, frequent.

The flowers will coagulate boiling milk; and Dr. Withering ſays, the beſt Cheſhire cheeſe is prepared with them. The French preſcribe them in hyſteric and epileptic caſes. Boiled in alum-water they tinge wool yellow. Mr. Pennant ſays, that the roots dye a very fine red, not inferior to madder, and are uſed for this purpoſe in the iſland of Jura.

GALIUM *uliginoſum.* *Marſh Gooſegraſs.* P. July.

Pleaſly park; in marſhes about Coxbench.

Horſes, cows, ſheep, goats, and ſwine eat it.

GALIUM *aparine.* *Catchweed, Gooſegraſs.* *Cleavers.* *Clivers.* A. May. June.

Common, in hedges.

The plant is eaten by horſes, cows, ſheep, and goats. Swine refuſe it. Young geeſe are very fond of the branches.—The expreſſed juice of the ſtems and leaves, taken to the amount of four ounces, night and morning, is very efficacious in removing many of thoſe cutaneous eruptions which are called, though improperly, ſcorbutic. It muſt be continued for ſeveral weeks.

GALIUM *mollugo.* *White Ladies bedſtraw.* *Wild Madder.* *Great baſtard Madder.*

Hedges, frequent. Pinxton. July.

GALIUM *montanum.* Hudſ. GALIUM *procumbens.* With. *Trailing Ladies bedſtraw.*

Middleton dale. Mr. Coke. P. July.

GALIUM *puſillum.* *Leaſt Gooſegraſs.*

Middleton dale. Mr. Coke. P. May.

CORNUS *ſanguinea.* *Dogberry tree.* *Prick wood.* *Gatten tree.* *Gatter tree.* S. June.

Frequent in hedges. Derby; Kedleſton; Glapwell; Pinxton.

The wood is very hard and ſmooth, fit for the purpoſes of the turner. The berries are bitter and ſtyptic: they dye purple.

Horſes, ſheep, and goats eat it. Swine and cows refuſe it.

ALCHEMILLA *vulgaris.* *Common Ladies Mantle.* P. June.—Sept.

Frequent in meadows and paſtures.

The whole plant is weakly aſtringent. Dr. Withering ſays, in the province of Smolandia in Gothland, they make a tincture of the leaves and give it in ſpaſmodic or convulſive diſorders.

Horſes, ſheep, and goats eat it. Swine refuſe it. Cows are not fond of it.

Order II.

DIGYNIA. II. POINTALS.

APHANES *arvenſis.* *Common parſleypiert.*
Derby. A. June.

Order III.

TETRAGYNIA. IV. POINTALS.

ILEX *aquifolium.* *Common Holly.*
Frequent. T. April.—June.

Birds eat the berries. The bark fermented, bruiſed, and afterwards waſhed from the woody fibres makes the common bird-lime. It makes an impenetrable fence and bears cropping. Neither its verdure or the beauty of its ſcarlet berries is obſerved to be affected by the ſevereſt weather. The wood is uſed in fineering, and is ſometimes ſtained black to imitate ebony. Handles for knives, and cogs for mill-wheels are made of it.

POTAMOGETON *natans.* *Broad-leaved Pondweed.* P. May.—Aug.

Moiſt ground adjoining to Radbourn common.

Claſs V.

PENTANDRIA *MONOGYNIA.*

V. CHIVES. I. POINTAL.

MYOSOTIS *ſcorpioides.* *Mouſe-eared Scorpiongraſs.* May. June.

Dry ſituations; frequent.

When it grows in the water, and its taſte and ſmell are by that means rendered leſs perceptible, ſheep will ſometimes eat it; but it is generally fatal to them. Dr. Withering.—— Cows, horſes, ſwine, and goats refuſe it.

MYOSOTIS *arvenſis*. A. }
——— *paluſtris*. P. } Common.

LITHOSPERMUM *officinale*. *Common Gromwell.* P. June.

Matlock. Mr. Hallows.

Sheep and goats eat it. Cows and horſes refuſe it.

LITHOSPERMUM *arvenſe*. *Leſſer Gromwell. Baſtard Alkanet. Painting Root.*

Alleſtry. A. May. June.

The bark of the root tinges wax and oil of a beautiful red, ſimilar to that, which is obtained from the foreign alkanet that is kept in the ſhops.—Sheep and goats eat it. Cows are not fond of it. Horſes and ſwine refuſe it.

CYNOGLOSSUM. *Houndstongue.*

Aſhover, in a hedge. Matlock, but not very common. P. June.

The root and leaves have been ſuſpected by ſome to poſſeſs narcotic properties, but others will not admit the fact. It is diſcarded from the preſent practice; but Mr. Ray ſays that Dr. Hulſe uſed a decoction of the roots inwardly, and applied cataplaſms of them outwardly in ſtrumous and ſcrophulous caſes.—The ſcent of this plant is ſaid to be very diſagreeable and very much to reſemble that of mice.—Goats eat it. Cows, horſes, ſheep, and ſwine refuſe it.

SYMPHYTUM. *Comfrey.* P. May.—July. Wingerworth; Derby; Mackworth. A variety with purple bloſſoms in ſeveral places near Derby, and in a ditch near Duffield bridge.

Dr. Withering ſays, that the leaves give a grateful flavour to cakes and panada. The young ſtems and leaves are frequently eaten when boiled. The roots are glutinous and mucilaginous, and a decoction of them is uſed by the dyers to extract the colouring matter of gum lac.

Cows and ſheep eat it. Horſes, goats, and ſwine refuſe it. Dr. Stokes obſerves, that a horſe eat it.

LYCOPSIS *arvenſis.* *Small Bugloſs.*
Not uncommon. A. June.

Cows, horſes, ſheep, and goats eat it. Swine refuſe it.

ECHIUM *vulgare.* *Viper-graſs.* *Viper's Bugloſs.* Rather frequent. B. June.—Sept.

When cultivated in gardens, it grows very large, and makes a beautiful ſhowy appearance.

Cows and ſheep are not fond of it. Horſes and goats refuſe it. Bees are fond of the flowers, but their wings are ſometimes injured by the ſtrong hairs.

PRIMULA *veris. Cowſlips.* P. Apr. May.

Common in meadows and paſtures.

The bloſſoms are uſed for making wine.—Silk-worms are fond of the leaves and flowers. *Tranſ. of ſoc. of arts, vol.* ii. *p.* 157.

PRIMULA *elatior. Oxlip.* P. Apr. May.

Near Rough Heanor houſe, Mickleover. Pilkington.

PRIMULA *vulgaris. Primroſe.*

Common. P. Apr. May.

Gerard ſays, that a dram and half of the dried roots, taken up in autumn, operates as a ſtrong but ſafe emetic.—Sheep and goats eat it. Cows are not fond of it, and ſwine refuſe it. Silk-worms may be fed with the leaves. *Tranſ. of ſoc. of arts, vol.* ii. *p.* 157.

MENYANTHES *trefoliata. Buckbean. Marſh trefoil. Water trefoil. Marſh cleavers.*

Ponds and pits, not unfrequent. S. Normanton. In a pit by the foot road betwixt Mackworth and Kedleſton. P. June. July.

The leaves have a penetrating bitter taſte. An infuſion of them is frequently preſcribed in rheumatiſms, and ſometimes in dropſies. It is alſo given to deſtroy worms. It has had great reputation in ſcorbutic and ſcrophulous diſorders. A dram of the leaves in powder purges and vomits. Dr. Withering ſays, that in a ſcarcity of hops this plant is uſed in the north of Europe to bitter the ale; two ounces ſupply the place of a pound of hops. Some people ſay that ſheep will eat it, and that it cures them of the rot; but from the Upſal experiments it appears, that tho' goats eat, ſheep ſometimes will, and ſometimes will not. Cows, horſes, and ſwine refuſe it.

HOTTONIA *paluſtris. Water Violet. Water Yarrow. Water Gilliflower.* P. July.

Ditches in the meadows below Derby. Mr. Whately.

LYSIMACHIA *nemorum. Wood Looſeſtrife or Yellow Pimpernel of the Woods.*

Coxbench wood. Nurſery by Mr. Eames's, Mackworth. In a hollow ſhady foot road betwixt Burley and Duffield. P. May. June.

LYSIMACHIA *nummularia. Creeping Moneywort. Herb Twopenny.* P. June.

Between Derby and Coxbench. Dr. Johnſon. Meadows about Derby. Mr. Whately.

The plant is a little acrid, and ſomewhat aſtringent.—Cows and ſheep eat it. Goats are not fond of it. Horſes refuſe it.

LYSIMACHIA *tenniela.* *Purple Moneywort or Looſeſtrife.*

In moiſt ſituations. Pleaſly, Pinxton, and Normanton.

ANAGALLIS *arvenſis.* *Male Pimpernel.*
A. May.—Aug.

Common. The bloſſom is ſcarlet.

Mr. Dickenſon obſerves, it is remarkable with what a ſparing hand nature has dealt out her richeſt and moſt glorious colour, for except this and the poppies, I do not recollect any indigenous plant of a ſcarlet colour.

This plant was much uſed by the antient phyſicians in maniacal and melancholic caſes, but is very little regarded in modern practice.

Cows and goats eat it. Sheep refuſe it.—Small birds are very fond of the ſeeds.

CONVOLVULUS *arvenſis.* *Small Bindweed.*
June.—Aug.

Frequent in corn fields and road ſides.

Cows, horſes, goats, and ſheep eat it. Swine refuſe it.—The bloſſoms give a deep yellow or orange tincture to water, which is heightened by alum and alkalies.

CONVOLVULUS *ſepium.* *Great Bindweed.*

Frequent in moiſt hedges. P. July. Aug.

The inſpiſſated juice of the plant, in doſes of 20 and 30 grains, is a powerful draſtic purge. Dr. Withering ſays, that ſcammony is the inſpiſſated juice of a ſpecies of convolvulus ſo much reſembling this, that they are with difficulty diſtinguiſhed. Can it then be worth while to import ſcammony from Aleppo at a conſiderable annual expence, when a medicine with the very ſame properties grows ſpontaneouſly in many of our hedges? Tho' an acrid purge to the human race, it is eaten by hogs in large quantities without any detriment.

Sheep, goats, and horſes eat it. Cows refuſe it.

POLEMONIUM *cæruleum.* *Greek Valerian.* *Jacob's Ladder. Ladder to Heaven.* P. June.

Matlock, Alfreton brook. Mr. Coke.—Lover's Leap, near Buxton. Mr. Wood.—By the ſide of the turnpike road, in Bakewell meadows. Mr. Whately.

On account of its beauty it has been introduced into the Engliſh gardens.—Cows, goats, and ſheep eat it. Horſes are not fond of it.

CAMPANULA *rotundifolia.* *Round-leaved Bellflower.* P. Aug.—Oct.

Chee Tor.

The juice of the petals ſtains blue, but with the addition of alum, green. A green pigment is obtained from them.

Linnæus ſays, that cows, horſes, ſheep, and goats will eat it. But Dr. Stokes found, that a horſe refuſed it.

CAMPANULA *patula. Spreading Bellflower.*

Frequent. B. July. Aug.

CAMPANULA *latifolia. Broad-leaved Bellflower. Giant Throatwort.* P. July. Aug.

Betwixt Aſhbourn and Dovedale. Dr. Johnſon.—Little Cheſter, near Derby. Betwixt Rowſley and Darley. Matlock. Pilkington.

It is very deſerving of a place in our flower borders. The whole plant abounds with a milky liquor.—Horſes, ſheep, and goats eat it.

CAMPANULA *trachelium. Nettle-leaved Bellflower, Great Throatwort, or Canterbury Bells.* P. July.—Sept.

Hedges. Pinxton. Mr. Coke.—Betwixt Duffield bridge and Makeney. Pilkington.

Cows eat it. Horſes and goats refuſe it.

VERBASCUM *thapſus. Great white Mullein. High Taper. Cows Lungwort. Ladies Foxglove.* B. July.—Sept.

Middleton dale. Mr. Coke.—Matlock, on the heights of Abraham, and Makeney, near Duffield. Pilkington.

Externally uſed this plant is emollient. Dr. Home adviſes a decoction of it, two ounces to a quart, in diarrhœas of an old ſtanding; he gave a quart every day. *Clin. Exp. p.* 439. it eaſes the pains of the inteſtines; is uſed as an injection with advantage; and is often applied externally to the piles. *ib.*—It is ſaid to intoxicate fiſh, ſo that they may be taken with the hand.—In Norway they give it to cows, which are conſumptive.—The down ſerves for tinder.

It is not known, that any of the brutal creation will eat it.

VERBASCUM *nigrum. Black Mullein.*

Stanton. Mr. Coke. P. July.—Sept.

The flowers are grateful to bees. Swine will eat it. Sheep are not fond of it. Cows, horſes, and goats refuſe it.

DATURA *ſtramonium. Thorn-apple.*

Derby and Pinxton. A. July.

An ointment prepared from the leaves gives eaſe in external inflammations and hæmorrhoids. The Edinburgh college direct an extract to be prepared by evaporating the expreſſed juice of the leaves. This has been given with advantage in convulſive affections and epilepſies. Out of 14 epileptic patients 8 were entirely cured by it, at Stockholm. The doſe from 2 to 16 grains a day. *Med. Com.* i. 368. iii. 22.

See alſo *Lond. Med Journ.* ii. 295. The ſeed or leaves taken internally bring on delirium, tremors, ſwelling, itching, eruption and inflammation on the ſkin; theſe effects were produced by a doſe of a dram and a half in a girl 9 years old. See Dr. Fowler's account, *Med. Comm. vol.* v. *p.* 164.

It is refuſed by every animal.

HYOSCYAMUS *niger.* *Common Henbane.*
B. June.

Nun's green, Derby; Chelaſton; Pinxton.

Every part of the plant is poiſonous. Madneſs, convulſions and death are the general conſequence of taking it internally. Yet in a certain quantity it has been uſed in medicine. The expreſſed juice is evaporated to an extract. The doſe is from half a ſcruple to half a dram. Dr. Withering thinks, that it may be advantageouſly joined with opium, where the effects of that medicine are deſirable, and coſtiveneſs is to be avoided. Dr. A. Fothergill has given two caſes of madneſs, in which he experienced the good efficacy of the extract from this plant. One was a deep melancholy, and was entirely removed. The other was a puerperal mania, and the medicine in this inſtance was attended with equal ſucceſs. *Memoirs of med. ſoc. of London,*

London, art. 23. It appears, that great caution is neceſſary in the uſe of this plant.

It is ſaid, that ſheep ſometimes eat it when it is young.

SOLANUM *nigrum. Common garden Nightſhade.* A. June.—Oct.

Pinxton; Derby. Not very common.

From one to three grains of the leaves infuſed in boiling water, and taken at bed-time occaſions a copious perſpiration, encreaſes the ſecretions of the kidnies and generally purges more or leſs the following day. Theſe properties, judiciouſly applied, render it capable of doing eſſential ſervice in ſeveral diſeaſes, as may be ſeen in Mr. Gataker's treatiſe on the ſolanum. But Dr. Withering obſerves, that its effects on the nervous ſyſtem are ſo uncertain and ſometimes ſo conſiderable, that it muſt ever be adminiſtered with the greateſt caution. The leaves uſed externally abate inflammations and aſſuage pain. The flowers ſmell like muſk.

It is not eaten by any animal.

SOLANUM *dulcamara. Bitter-ſweet, woody Nightſhade.* P. June. July.

Moiſt hedges and ditches, frequent.

Boerhaave ſays it is a medicine far ſuperior to China and Sarſaparilla as a ſweetner and reſtorative.

ſtorative. Linnæus thought an infuſion of the young twigs an admirable medicine in acute rheumatiſms, inflammations, fevers, and ſuppreſſion of the lochia. Dr. Hill ſays he has found it very efficacious in the aſthma. Dr. Hallenberg advices it in iſchiatic and rheumatic pains, jaundice, ſcurvy, and lues venerea. He directs a pint of boiling water to be poured upon 2 drams of the ſtalks ſliced and dried; after ſtanding half an hour, it muſt be boiled 15 minutes. The doſe 2 tea-cups full or more, morning and evening. The ſtalks may be gathered early in the ſpring, or at the end of autumn. *Med. Com. vol.* 3. *p.* 15. Mr. Beddoes ſays, the root has the ſmell of the potatoe.—Sheep and goats eat it. Horſes, cows, and ſwine refuſe it.

The ſtalk has at firſt a bitter taſte, which is followed by a pleaſant ſweetneſs. On this account it is frequently eaten by children, without their receiving any injury from it. Pilkington.

ATROPA *belladonna. Deadly or ſleepy Nightſhade. Dwayberries.* P. June.—Aug. Fruit ripe from Auguſt to October.

Near a pond at Hardwicke. Mr. Hallows.—Horſely caſtle. Dr. Johnſon.—It may be conſidered as one of the ſcarce plants of Derbyſhire.

The whole plant is poiſonous. Thoſe who eat the berries, are ſeized with ſtupor or delirium and become variouſly convulſed. Death is the unavoidable conſequence, if a ſtrong emetic be not immediately employed, to diſcharge the poiſon from the ſtomach. For this purpoſe has been recommended a large glaſsful of warm vinegar, or repeated draughts of a tea ſpoonful of ſpirits of hartſhorn, taken in a large glaſs of brandy and water, as theſe narcotics frequently diminiſh the irritability of the ſtomach, ſo far as to render it inſenſible to the operation of vomits.—Tumours of the breaſts even of the cancerous kind are ſaid to have been reſolved by a topical application of the freſh leaves. Dr. Graham in the *Med. Communications, vol.* 1. *p.* 419. ſays, he found great benefit from a poultice made of the roots boiled in milk and applied to hard ill-conditioned tumours and ulcers; and relates a deplorable caſe, in which this poultice effected a perfect cure. The powdered root has been given in doſes of ten or more grains every other night as a preventative after the bite of a mad dog. *Lond. Med. Journ. vol.* iii. *page* 199. Dr. Withering has no doubt but the external application of this plant may be productive of good effects in ſeveral caſes, but he thinks it dangerous, when the ſkin is broken.

An infuſion of the dried leaves has been uſed for a cancer in the breaſt with ſucceſs. *Phil. Tranſ. vol. 50. p. 77.*

The juice of the ripe berries ſtains paper of a beautiful and durable purple.

LONICERA *periclymenum.* *Common Honeyſuckle. Woodbine.* S. May. June.

Frequent in hedges.—Cows, goats, and ſheep eat it. Horſes refuſe it.

RHAMNUS *catharticus.* *Purging Buckthorn.* Apr. May.

Not uncommon in hedges and woods.

The juice of the berries is a nauſeous purgative, and made into a ſyrup is uſed in medicine. About an ounce of it is a moderate doſe; but it generally occaſions ſo much ſickneſs and griping that it is falling into diſuſe. The juice of the unripe berries is of the colour of ſaffron, and is uſed for ſtaining maps or paper. Theſe are ſold under the name of French berries.—The juice of the ripe berries is the ſap green of the painters; but if they are gathered late in the autumn the juice is purple.—The bark affords a beautiful yellow dye.—Goats, ſheep, and horſes eat it. Cows refuſe it.

RHAMNUS *frangula.* *Black berry-bearing Alder.* S. May.

Glapwell. Mr. Hallows.

From a quarter to half an ounce of the inner bark, boiled in ſmall beer, is a ſharp purge. In dropſies, or conſtipations of the bowels of cattle, it is a very certain purgative. The berries gathered before they are ripe, dye wool green. The bark dyes yellow, and with preparations of iron, black.

Charcoal prepared from the wood is preferred by the makers of gunpowder. The flowers are particularly grateful to bees. Goats devour the leaves with greedineſs, and ſheep will eat them.

EVONYMUS *europæus.* *Spindle tree, Prick wood, Prick timber tree, Gatteridge tree, Louſe berry.*

Matlock. S. April. May.

The berries vomit and purge violently, and are fatal to ſheep. Powdered and ſprinkled upon the hair, they deſtroy lice. If the wood is cut when the plant is in bloſſom, it is tough and not eaſily broken; and in that ſtate is uſed by watch-makers, and to make ſkewers and tooth picks.—Cows, goats, and ſheep eat it. Horſes refuſe it.

RIBES *rubrum.* *Currants.* S. May.

Pinxton. On the banks of the Derwent betwixt Duffield and Derby; and in ſeveral places by the ſide of a brook betwixt Mackworth and Markeaton.

The ripe fruit is univerſally acceptable, and the juice is very agreeable both in punch and when converted by the addition of ſugar into a jelly.—Cows, goats, and ſheep eat the leaves.

RIBES *uva-criſpa.* *Gooſeberry.* S. May.

Pleaſly park. Mr. Coke.—In hedges on the weſt ſide of the Derwent betwixt Duffield and Makeney; and on the hill, where Codnor caſtle formerly ſtood.

HEDERA *helix.* *Common Ivy.* S. Oct. Nov.

Common upon old buildings, to which it is ſometimes a very beautiful ornament.

Dr. Withering ſays, that the berries have a little acidity; and that they purge and vomit.

Horſes and ſheep eat it. Goats and cows refuſe it.

VINCA *minor.* *Leſſer Periwinckle.*

In a hedge within the Roman ſtation at Little Cheſter near Derby. P. May. Sept.

VINCA *major.* *Greater Periwinckle.*

Pleaſly park. Mr. Coke. P. June.

Dr. Withering ſays it is bitter and ſlightly aſtringent.

Order II.

DIGYNIA. II. POINTALS.

Herniaria *hirſuta*. *Hairy Rupturewort*. Duffield. Mr. Hadley. A. July.

Chenopodium *bonus-Henricus*. *Common Engliſh Mercury*. *All-good*. *Good Henry*. *Good King Henry*. *Wild Spinage*. P. May.

Frequent amongſt rubbiſh, on road ſides and walls.

The young ſhoots peeled and boiled are eaten as aſparagus, but with ſome perſons they have a griping effect.—The roots are given to ſheep which have a cough.

Goats and ſheep are not fond of it. Cows, horſes and ſwine refuſe it.

Chenopodium *urbicum*. *Upright Gooſe-foot*. A. Aug. Sept.

Frequent on dunghills and amongſt rubbiſh. Goats and ſheep eat it. Horſes aud cows refuſe it.

Chenopodium *polyſpermum*. *Upright Blite*. *All-ſeed*. A. Auguſt.

Not uncommon.—Cows and ſheep eat it. Goats and horſes refuſe it.

Chenopodium *viride*. *Green Gooſefoot*.

Common in kitchen gardens.—Goats, ſheep, and ſwine eat it.

CHENOPODIUM *album.* *Common wild Orache.* A. Auguſt.

Common on dunghills. Cows, goats, and ſheep eat it. Horſes refuſe it. Swine are extremely fond of it. Linnæus. But Dr. Stokes ſays, that horſes ſometimes eat it, and even appear fond of it.

CHENOPODIUM *murale.* *Wall Gooſefoot.* A. July. Auguſt.

Betwixt Derby and Duffield.

Cows eat it; but it is ſaid to be poiſonous to ſwine.

CHENOPODIUM *vulvaria.* *Stinking Gooſefoot.* *Stinking Orache.* A. Aug.

Dethick. Mr. Hallows.

The ſcent is rank and fetid. Dr. Withering ſays, that it has got the reputation of being an anti-hyſteric.—Cows, horſes, goats, and ſheep eat it. But ſwine refuſe it.

ULMUS *campeſtris.* *Common Elm.* Apr.

Hedges, but not very common.

The wood, being hard and tough, is capable of being converted to many uſeful purpoſes. The leaves are not only eaten by horſes, cows, ſheep, goats, and ſwine, but from ſome late experiments have been found very acceptable to ſilk-worms. By its height and ſhape this tree is a beautiful ornament to the country, where it grows. It loves an open ſituation and bears to be tranſplanted. Dr. Withering ſays, that a decoction of the inner bark has been known to carry off the water in dropſies. The bark dried and ground to powder, has been mixed with meal in Norway to make bread, in times of ſcarcity.

Ulmus *montana.* *Broad-leaved Elm.*

Not unfrequent in the ſouthern part of the county. S. March.

Hydrocotyle *vulgaris.* *Marſh Penny-wort. White Rot.* P. May. June.

S. Normanton. Quarndon common.

Farmers ſuppoſe it occaſions the rot in ſheep.

Gentiana *centaurium:* *Centory Gentian.*

S. Normanton, Matlock, and wind-mill near Derby. A. June.—Aug.

It is very bitter. Dr. Withering ſays it is the baſis of the famous Portland powder which prevents fits of the gout, when taken in a large quantity, and a long time together; but brings on hardneſs of the liver, palſy, and apoplexy. A tincture of the leaves and upper part of the roots is a good medicine in weak ſtomachs, and cachectic habits. A decoction of the whole plants deſtroys lice, and cures the itch.—Cows are not fond of it, and in ſheep paſture it is frequently left untouched.

GENTIANA *pneumonanthe.* *Marſh Gentian, or Calathian Violet.* Auguſt.

Egginton heath.

GENTIANA *amarella.* *Fellwort.* *Autumnal Gentian.* A. Auguſt.

Pinxton. Mr. Coke.

SANICULA *europæa.* *Common Sanicle.*

In hedges, at S. Normanton, Mackworth, and Rough Heanor. P. July.

The leaves are ſlightly bitter, aromatic, and aſtringent.—Sheep eat it. Goats are not fond of it. Horſes refuſe it.

CAUCALIS *latifolia.* *Broad-leaved Hensfoot.* A. July.

Dovedale. Dr. Johnſon.

DAUCUS *carota.* *Common Carrot.* *Bird's Neſt.* B. June.—Aug.

Frequent in meadows and paſtures.

The ſeeds have been ſometimes uſed as diuretics and carminatives; and are highly recommended in calculous complaints. Dr. Withering.—An infuſion of them has been found to afford relief in ſharp fits of the gravel. Mr. Woodward.—It proved very beneficial in the caſe of a lady who paſſed calculi of conſiderable ſize. Dr. Stokes.

2. This in its cultivated ſtate is the well known garden carrot, whoſe roots are eaten either boiled or raw. When raw, they are given to children troubled with worms. They ſeem to paſs thro' moſt people but little changed. Dr. Withering.—On which account I have employed them as a means of aſcertaining the time which food takes to paſs through the tract of the alimentary canal. Dr. Stokes.—They are a grateful and nutritious food to all kinds of cattle, and well worthy of a more general cultivation for the purpoſe of the farmer. Crickets are very fond of them, and are eaſily deſtroyed by making a paſte of powdered arſenic, wheat meal, and ſcraped carrots, which muſt be placed near their habitations. A poultice made of the roots has been found to mitigate the pain, and abate the ſtench of foul and cancerous ulcers.

BUNIUM *flexuoſum.* *Earth-nut.* *Pig-nut.*
P. June. May.

Frequent in meadows and paſtures.

The roots either raw, boiled or roaſted have a pleaſant taſte, and are frequently eaten by children. Dr. Withering thinks, that they are very little inferior to cheſnuts, and would be an agreeable addition to our winter deſerts.

CONIUM *maculatum.* *Common Hemlock.* *Kex.* B. June. July.

Common in hedges, road ſides, and orchards. The whole plant is poiſonous, yet a few years ago it was much uſed in medicine. At preſent it has loſt ſome meaſure of its reputation. Dr. Withering has aſſigned ſeveral reaſons for the change, which has taken place in the public opinion in regard to its value. He ſays, that wild Cicely or Cow-Weed has been often gathered inſtead of this plant; that the ſeaſon of its higheſt perfection has never been yet ſufficiently aſcertained, that its properties are often impaired by the fermentation occaſioned by want of care in gathering it, and in obtaining the extract it has loſt part of its virtue by the application of too great heat. He then directs in what manner the extract ſhould be prepared. He ſays, let ſeveral people be employed to gather the plant, and as faſt as it is cut, let others carry it in hand baſkets to the preſs; but it muſt lie light and looſely in the baſkets. Let it be bruiſed and the juice immediately ſqueezed out; and as faſt as it runs from the preſs, it muſt be put over the fire, and boiled till three parts out of four of the whole liquor is waſted. Then it muſt be put into a water bath, and evaporated to the conſiſtence of honey. If it be now taken and ſpread thin upon a board or marble ſlab, and expoſed to the ſun and to the air, it will ſoon be of a proper conſiſtence to be formed into pills. From 5 to 10 grains of this extract is a proper doſe; few conſtitutions will bear more without experiencing diſagreeable effects.—He has never given it in cancers without a mitigation of the pain and an amendment of the diſcharges. He thinks it preferable to opium on ſome accounts, and obſerves, that if it ſhould prove at laſt that it is only a narcotic, ſurely there are many caſes, in which a narcotic, that does not occaſion coſtiveneſs is preferable to one, which does.

In the ſecond edition of his valuable work Dr. Withering makes ſome remarks in addition to thoſe, which were contained in the firſt. He obſerves, that ſuch is the uncertainty of the preparation owing to the difficulty of making the extract, that he has now for ſome years laid aſide the uſe of it and preſcribed only the powder of the dried leaves. He ſays, let the leaves be gathered about the end of June, when the plant is in flower. Pick off the little leaves and throw away the leaf-ſtalks. Dry theſe ſelected leaves in a hot ſun or on a tin dripping-pan or pewter diſh before a fire. Preſerve them in bags made of ſtrong brown paper or powder them and keep the powder in glaſs vials, in a drawer or ſomething, which will exclude the light, for the light ſoon diſſipates the beautiful green colour, and with its colour the medicine loſes its efficacy. From 15 to 25 grains of this powder may be taken twice or thrice a day. He has found it particularly uſeful in chronic rheumatiſms, and alſo in many of thoſe diſeaſes which are uſually ſuppoſed to ariſe from acrimony. He concludes with ſaying, I can aſſure the medical practitioner that this is well worth his attention.

HERACLEUM *ſphondylium*. *Common Cow Parſnep. Madnep. Hogweed.* B. July.

Frequent in hedges, meadows and paſtures.

In Poland and Lithuania, the poor people prepare a liquor from the leaves and ſeeds, which undergoes a fermentation and is drank inſtead of ale. The ſtalks when peeled are eaten by the Kamſchatkians.—The Ruſſians diſtil an ardent ſpirit from this plant.—The leaves are a favourite food of rabbits; and hogs, cows, goats and ſheep eat them, but horſes are not fond of them.

HERACLEUM *anguſtifolium*. *Jagged Cow Parſnep.*

This plant is a variety of the *Her. ſphon.* and was found by Dr. Stokes betwixt Aſhbourn and Okeover.

ANGELICA *ſylveſtris*. *Wild Angelica.*

Marſhy woods and hedges. P. June. July.

It is warm, acrid, bitter and aromatic. The roots poſſeſs theſe properties in the greateſt degree. The ſtalks are ſaid to make an agreeable ſweetmeat. The plant is much improved by cultivation.

Cows, goats and ſwine eat it. Horſes re-refuſe it. Linn.—Dr. Stokes ſays, a horſe eat the flowering ſtem.

SIUM *nodiflorum*. *Creeping Water Parſnep.*

Bakewell meadows. Mr. Coke. P. Aug.

Dr. Withering ſays, that a young lady ſix years old was cured of an obſtinate cutaneous diſeaſe by taking three large ſpoonfuls of the juice twice a day, and that he has repeatedly given to adults three or four ounces every morning in ſimilar complaints, with the greateſt advantage. It is not nauſeous, and children take it readily with milk. He adds, that in the doſes he has given it, it neither affects the head, the ſtomach, nor the bowels.

SISON *amomum*. *Baſtard Stone Parſley.*

Moiſt woods and hedges. P. July.

The Seeds are a mild warm aromatic. They impart their virtues to rectified ſpirit and tinge it green.

OENANTHE *fiſtuloſa.* *Water Dropwort.* P. July.

Not uncommon in ponds and ditches; Pinxton.

Cows and horſes refuſe it, though from experiments made on purpoſe it does not appear to be in the leaſt degree noxious to the former.

ÆTHUSA *cynapium.* *Fool's Parſley.* *Leſſer Hemlock.* A. July.

S. Normanton, and in gardens at Derby.

This plant, from its reſemblance to common parſley, has ſometimes been miſtaken for it, and when eaten it occaſions ſickneſs. Dr. Withering obſerves, that if the curled-leaved parſley only was cultivated in our gardens, no ſuch miſtakes would happen.

Cows, horſes, ſheep, goats, and ſwine eat it. It is noxious to geeſe.

SCANDIX *odorata.* *Sweet Cicely.* *Great Sweet Chervil.* *Sweet Fern.*

Banks of the Derwent above Chatſworth. Mr. Whately.

Mr. Woodward ſays, that the ſeeds are uſed in the north of England for poliſhing and perfuming oak floors and furniture.

SCANDIX *pecten.* *Shepherd's Needle.* *Crake Needle.* *Venus's Comb.* A. July.

In corn fields; Pinxton.

CHÆROPHYLLUM *ſylveſtre.* *Wild Cicely.* *Cow Weed.* *Cow Parſley.* May.

Common about Derby.

The roots eaten as parſneps have been found poiſonous. The leaves and ſtems afford a beautiful green dye. Cows and rabbits are fond of it. Mr. Curtis ſays, that in ſome parts of the kingdom, in times of ſcarcity, it is uſed as a pot herb.

ÆGOPODIUM *podograria.* *Herb Gerard.* *Gout Weed.* *Aſh-weed.* *Ground Aſh.* P. May, June.

Pinxton; about Coxbench wood.

Cows, ſheep and goats eat it. Horſes are not fond of it.—It is ſaid, that the leaves may be eaten early in the ſpring with other pot-herbs.

SESELI *carnifolia.* *Meadow Saxifrage.*

S. Normanton. Mr. Coke.

APIUM *graveolens.* *Smallage Parſley.* July.

Pinxton. Mr. Coke.

The root in its wild ſtate (when it grows near water,) is ſaid to be fetid, acrid, and noxious; but that when cultivated (in dry ground) it loſes theſe properties, and the root and lower part of the leaf-ſtalks and ſtem blanched by covering them up with earth, are eaten raw, boiled in ſoups, or ſtewed. In this ſtate they are called Celery. They are ſaid to be hurtful to people ſubject to nervous complaints. They are certainly good antiſcorbutics. The ſeeds yield an eſſential oil.

Sheep and goats eat it. - Cows not fond of it. Horſes refuſe it.

Order III.

TRIGYNIA. III. POINTALS.

VIBURNUM *lantana.* *Pliant Mealy-tree. Way-faring-tree.* S. May.

Glapwell; Langwith. Mr. Hallows.

The bark of the root is uſed to make bird-lime. The berries are drying and aſtringent.

VIBURNUM *opulus.* *Water Elder.* June. Berries ripe in Sept.

Woods and wet hedges. The Guelder roſe is a variety of this plant.—Cows, goats and ſheep eat it. Horſes are not fond of it.

SAMBUCUS *ebulus*. *Dwarf Elder. Danewort. Wallwort.* S. June.

S. Normanton; Bakewell; Dethick; Wirkſworth; Buxton; Alport near Youlegrave; and Boulton.

It has the ſame medical properties with the common elder, but is in ſome reſpects more violent, and therefore leſs manageable. A dram and a half of the root is a ſtrong purge.—The berries give out a violet colour.—The green leaves drive away mice from granaries, and the Sileſians ſtrew them, where their pigs lie, under a perſuaſion, that they prevent ſome of the diſeaſes, to which they are liable.

It is not eaten by any animal.

SAMBUCUS *nigra*. *Common Elder*. S. May. The berries are ripe in Sept.

Common in woods and moiſt hedges.

The whole plant has a faint unpleaſant, narcotic ſmell. It is ſaid not to be ſafe to ſleep under its ſhade.—The inner green bark is purgative, and may be uſed with advantage, where acrid purgatives are requiſite. The expreſſed juice is given from a dram to half an ounce; and Sydenham obſerves, that if it does not vomit or purge at all, or but gently, it does no ſervice. In ſmaller doſes it is diuretic, and has done eminent ſervice in obſtinate glandular obſtructions, and in dropſies. Dr. Withering ſays, that if ſheep, which have the rot, are in a ſituation where they can get at the bark and the young ſhoots, they will ſoon cure themſelves. It is an ingredient in the black dye.—The leaves are purgative like the bark, but more nauſeous. They are celebrated externally againſt burns and inflammations, and are an ingredient in ſeveral cooling ointments. If turneps, cabbages, fruit trees, or corn, (which are ſubject to blight from a variety of inſects) be whipped with the green leaves and branches of elder, the inſects will not attack them. *Phil. Tranſ. vol.* 62. *p.* 348. A decoction of the flowers, taken internally, is ſaid to promote expectoration in pleuriſies. If the flowers are freſh gathered they looſen the belly. Externally they are uſed in fomentations to eaſe pain, and remove ſunburn. They are fatal to turkies. A rob prepared from the berries is a gentle opener, and promotes perſpiration. The juice of the berries with raiſins or ſugar is frequently made into wine, and produces the ſame effect with the rob. The berries are ſaid to be poiſonous to poultry.—The pith being exceedingly light, is cut into balls, uſed in electrical experiments.

A variety of the elder with light green berries grows at Mackworth. The wine made from them is generally prefered to that made with the juice, which is extracted from the other ſort.

ALSINE *media.* *Common Chickweed.*
Frequent in gardens and cultivated ground.
A. March. Oct.

This ſpecies is a notable inſtance of what is called the Sleep of Plants; for every night the leaves approach in pairs, ſo as to include within their upper ſurfaces the tender rudiments of the new ſhoots; and the uppermoſt pair but one at the end of the ſtalk, are furniſhed with longer leaf-ſtalks than the others, ſo that they can cloſe upon the terminating pair and protect the end of the branch. Linn.

Dr. Withering ſays, that the young ſhoots and leaves, when boiled, can hardly be diſtinguiſhed from ſpring ſpinach, and are equally wholeſome.

Swine are extremely fond of it. Cows and horſes eat it. Sheep are indifferent to it. And goats refuſe it. It is a grateful food to moſt ſmall birds, and to young chickens.

Order IV.

TETRAGYNIA. IV. POINTALS.

PARNASSIA *paluſtris.* *Graſs of Parnaſſus.*
P. Aug.

Matlock; Normanton; Pinxton; and on boggy ground near Mr. Eames's, Mackworth.

Horſes and goats eat it. Sheep are not fond of it. Cows and ſwine refuſe it.

Order

Order V.

PENTAGYNIA. *V.* POINTALS.

Linum *uſitatiſſimum.* *Common Flax.*
Pinxton. Mr. Coke. A. July.

It is obſerved, that the ſeeds yield, by expreſſion only, a large proportion of oil, which is an excellent pectoral, as is likewiſe the mucilaginous infuſion. They alſo make an eaſy and uſeful poultice in caſes of external inflammation. After the oil is extracted, the remaining part of the ſeed is made into cakes, which are given to cattle to fatten them. The oil itſelf differs in ſeveral reſpects from other expreſſed oils; it does not congeal in winter, nor does it form a ſolid ſoap with fixed alkaline ſalts; and it acts more powerfully as a menſtruum upon ſulphureous bodies. When heat is applied during the expreſſion it gets a yellowiſh colour, and a peculiar ſmell. In this ſtate it is uſed by the painters and the varniſhers. The ſtem is uſed in the manufacture of linen, which, after it is worn into rags, is converted into paper.

Linum *catharticum.* *Purging Flax.*
A. May.—July.

Pinxton; betwixt Derby and Radbourn.

Linnæus recommends an infuſion of two drams of the dried leaves as a mild laxative.—

Dr. Withering ſays, it is an excellent purge, and has been given with advantage in many obſtinate rheumatiſms. It frequently acts as a diuretic.

DROSERA *rotundifolia*. *Sundew*. *Roſa ſolis*. P. July. Aug.

Quarndon Common.

The whole plant is acrid. The juice will deſtroy warts and corns. It may be prepared with milk in ſuch a manner, as to take away freckles and ſunburn. It has the ſame effect upon milk as the Yorkſhire ſanicle, and like that is ſuppoſed to occaſion the rot in ſheep.

It is ſaid to derive its name from ſmall drops or globules of a pellucid liquor like dew, which is not waſted by the hotteſt ſunſhine. Dr. Withering ſays, perhaps the acrimony of the plant reſides in this ſecreted liquor.

Order VI.

POLYGYNIA. MANY POINTALS.

MYOSURUS *minimus*. *Little Mouſetail.*

Corn-fields near Derby. Mr. Whately.

The whole plant is acrid.

Claſs

Claſs VI.

THE Bulbous roots in this claſs are ſome of them noxious, as thoſe of the Daffodil, the Hyacinth, and the Fritillary; others are corroſive, as Garlick, but by roaſting or boiling they loſe great part of their acrimony.

HEXANDRIA *MONOGYNIA.*

VI. CHIVES. I. *POINTAL.*

Order I.

NARCISSUS *pſeudo-narciſſus. Common Daffodil.* P. April.

It covers a whole meadow upon the banks of the Derwent near Lea wood; Mellor's Can near Coxbench; Mackworth; Derby; and Breadſall Meadow.

ALLIUM *urſinum. Wild Garlick. Ramſons.* P. May.

Blackwell; Ford; Derley near Derby, upon an iſland in the Derwent; and Longford long lane, beyond Dalbury-Lees.

An infuſion in brandy, Mr. Pennant ſays, is eſteemed a good remedy for the gravel. *Tour,* 1772, 1772, *p.* 175. It has been obſerved, that other plants do not flouriſh in it's neighbourhood.

ALLIUM *vineale. Crow Garlick.* P. June.

Matlock; Duffield; and Breadſall Meadow.

The young ſhoots are eaten in ſallads, or boiled as a pot-herb.

ORNITHOGALUM *luteum. Yellow Star of Bethlehem.* P. April.

Park Hall woods, Rev. Mr. Paſhley: in a meadow adjoining to the Copper-mills, Derby. Mr. Whately.

Dr. Withering ſays, the bulbous roots are nutritious and wholeſome, and have been employed for food in a ſcarcity of proviſions.—Horſes, goats and ſheep eat it. Swine are not fond of it. Cows refuſe it.

NARTHECIUM *oſſifragum. Lancaſhire or Baſtard Aſphodel.* P. July.

Dethick. Mr. Hallows.

Cows and horſes eat it. Sheep and ſwine refuſe it.

CONVALLARIA *majalis. Lily of the Valley. May Lily.* May.

Matlock; Mr. Hallows. Dovedale.

The flowers are highly fragrant, but when dried have a narcotic ſcent. Reduced to a powder they excite ſneezing. An extract prepared from the flowers, or from the roots, partakes of the bitterneſs as well as of the purgative properties of aloes. The doſe is from 20 to 30 grains. A beautiful and durable green colour may be prepared from the leaves by the aſſiſtance of lime. Dr. Withering.

Sheep and goats eat it. Horſes, cows and ſwine refuſe it.

CONVALLARIA *multiflora.* *Solomon's ſeal.*

Pleaſly-Park. Mr. Hallows. May.

The young ſhoots are eaten by the Turks as aſparagus, and the roots have been made into bread. Linnæus.

Cows, goats and ſheep eat it.

HYACINTHUS *non-ſcriptus.* *Harebell. Engliſh Hyacinth.* P. May.

Frequent in hedges and woods.

The roots are ſaid to be poiſonous. They may be converted into ſtarch.

ACORUS *calamus.* *Myrtle Flag. Sweet ſmelling Flag, or Calamus.* P. May.

Cutthorpe near Cheſterfield. Mr. Hallows.

The root powdered might ſupply the place of our foreign ſpices. It is our only native true aromatic plant. Linn. The powder of the root has cured agues, when the Peruvian bark has failed. The roots have a ſtrong aromatic ſmell, and a warm, pungent, bitteriſh taſte. The flavour is greatly improved by drying. They are commonly imported from the Levant, but thoſe of our own growth are equally good, if not ſuperior. The root, candied, is uſed by the Turks as a preſervative againſt contagion.

It is refuſed by all animals.

JUNCUS *conglomerutus. Round headed Ruſh.*
——— *effuſus. Soft Ruſh.* P. June.
——— *articulatus. Jointed Ruſh.* P. July.
——— *campeſtris. Field Ruſh.* P. May.
——— *compreſſus. Flat ſtalked Ruſh.*
Frequent in moiſt places.

JUNCUS *bulboſus. Bulbous Ruſh.* June.
Little Cheſter, near Derby.

BERBERIS *vulgaris. Barberry. Pipperidge-buſh.* S. May.

In hedges at Mackworth.

The flowers at a proper diſtance have an agreeable ſcent. The berries, when boiled with ſugar, are very pleaſant to the taſte of moſt perſons.—An infuſion of the bark in white wine is gently purgative.—The roots boiled in lye, dye wool yellow. In Poland they dye leather of a moſt beautiful yellow with the bark of the root. With the aſſiſtance of alum, the inner bark of the ſtems dye linen of a fine yellow.—Dr. Withering obſerves, that this ſhrub ſhould never be permitted to grow in corn lands, for the ears of wheat, which grow near it, never fill, and its influence in this reſpect has been known to extend as far as 300 or 400 yards acroſs a field.

Cows, ſheep and goats eat it. Horſes and ſwine refuſe it.

Order II.

TRIGYNIA. III. *POINTALS.*

RUMEX *ſanguineus.* *Bloody Dock.*
Dethick. Mr. Hallows. B. July.
RUMEX *maritimus.* *Golden Dock.* P. July.
Near Swarkeſtone bridge. Ray. Mr. Coke.
RUMEX *obtuſifolius.* *Broad-leaved Dock.*
RUMEX *acetoſa.* *Common Sorrel.* P. June.
Meadows and paſtures.

The leaves are eaten in ſauces and in ſallads. The Laplanders uſe them to turn their milk ſour. In France they are cultivated for the uſe of the table, being introduced in ſoups, ragouts, and fricaſies. In ſome parts of Ireland they eat them plentifully with milk, alternately biting and ſupping. The Iriſh alſo eat them with fiſh, and other alcaleſcent food. The dried root gives out a beautiful red colour when boiled.

Rumex *acetoſella.* *Sheeps Sorrel.*
P. May. June.

Common in dry ſituations.

Colchicum *autumnale.* *Meadow Saffron.*
P. Sept.

Meadows at Marſton Montgomery; in the paſtures betwixt Duffield and Burley; very abundantly in Breadſal long-meadow; and near Derby.

This is one of thoſe plants, whoſe violent effects on the bodies of animal engage the attention of Dr. Storck of Vienna. Tho' the root had been conſidered as a ſtrong poiſon, he rendered it a ſafe and uſeful medicine. Boiled in vinegar, and the ſtrained vinegar ſweetened with honey or ſugar is found to be a good pectoral or diuretic. Dr. Withering thinks, that in its virtues, it very much reſembles ſquil, but is leſs nauſeous and acrimonious, tho' more ſedative.

In paſtures it is left untouched by cattle.

Order V.

POLYGYNIA. MANY POINTALS.

Alismo *plantago*. *Great Water Plantain.* P. July. Aug.

In watery places. Pinxton; and Derby.

Alismo *ranunculoides*. *Leſſer Water Plantain.*

Betwixt Derby and Burton. Mr. Whately.

Claſs VIII.

OCTANDRIA *MONOGYNIA.*

VIII. CHIVES. I. *POINTAL.*

Order I.

Epilobium *anguſtifolium*. *Roſebay. Willow Herb.* July.

Matlock; Darley. Mr. Coke.

Goats are extremely fond of it. Cows and ſheep eat it. Swine and horſes refuſe it.—An infuſion of the plant has an intoxicating property, and the Kamtſchatadales brew a ſort of ale from the pith, and from the ale make vinegar. The down of the ſeeds alſo mixed with cotton or fur has been manufactured into ſtockings and other articles of cloathing.

EPILOBIUM *hirſutum.* *Hairy Willowherb.* P. July.

——— *ramoſum.* *Codling and Cream.* P. July.

——— *montanum.* *Mountain Willowherb.* B. July.

——— *tetragonum.* *Square ſtalked Willowherb.* P. July.

——— *paluſtre.* *Marſh Willowherb.* P. July.

Not uncommon in moiſt ſituations.

Mr. Coke found a variety of the Epilobium hirſutum on Tideſwell moor.

CHLORA *perfoliata.* *Perforated Yellow-Wort.* A. June. July.

Pleaſly park. Mr. Coke. Whitewell.

VACCINIUM *myrtillus.* *Bilberries.* *Windberries.* *Black Worts.* *Hurtle-berries.*

Frequent on the moors and heaths.

Children are fond of the berries either alone, with milk, or in tarts. The moor game and crows feed upon them. The juice ſtains paper or linen purple.—Goats eat it. Sheep are not fond of it. Horſes and cows refuſe it.

Vaccinium *vitis-idæa.* *Red Whortle-berries. Red Bilberries.*

Frequent on the moors and mountains.

The berries, tho' not pleaſant, are often made into tarts. A conſiderable quantity is bought every year for this purpoſe by the inhabitants of Derby. They are ſometimes ſold to ignorant people for cranberries.—Goats eat it. Cows, ſheep and horſes refuſe it.

Vaccinium *oxycoccos.* *Cranberries.*

On the moors. S. May. June.

The berries by ſome are very much valued, and made into tarts. The ſound fruit may be kept many years cloſely corked up in bottles, either with or without water.

Erica *vulgaris.* *Common Heath.*

On the moors. S. June.—Sept.

In the iſland of Ilay, ale is frequently made by brewing one part malt and two parts of the young tops of heath. Sometimes they add hops. Boethius relates, that this liquor was much uſed by the Picts. *Pennant's tour*, 1772, *p.* 209.—Woollen cloth boiled in alum water, and afterwards in a ſtrong decoction of the tops of heath, receives a fine orange colour. The ſtalks and tops will tan leather. Beſoms are made of it, and faggots to heat ovens with, or to fill drains, which are to be covered over. —Bees extract honey from it, but the taſte

of

of it is not ſo pleaſant as when it is collected from other plants.—Mr. Pennant ſays, that cattle not accuſtomed to browſe on heath will give bloody milk, but are cured by drinking plentifully of water.

ERICA *tetralix.* *Croſs-leaved Heath.*

On Aſhover and Wirkſworth moors, and Egginton heath. July.

ERICA *cinerea.* *Fine-leaved Heath.*

Frequent on the moors. Aug.

ERICA *multiflora.* *Many-flowered Heath.*

Aſhover. July.

DAPHNE *mezereum.* *Mezereon.* *Spurge Olive.* *Spurge Flax.* *Dwarf Bay.*

S. Feb. March.

Matlock, Chee Tor. Mr. Coke.

An ointment prepared from the bark or the berries has been ſucceſsfully applied to ill-conditioned ulcers. The whole of the plant is very corroſive; 6 of the berries will kill a wolf. A woman gave 12 grains of the berries to her daughter, who had a quartan ague; ſhe vomited blood and died immediately. A decoction made of two drams of the cortical part of the root, boiled in three pints of water, till one pint is waſted; and this quantity drank daily is found very efficacious in reſolving venereal nodes and other indurations of the perioſteum.

rioſteum. *See Dr. Ruſſel's paper in the med. obſ.* iii. *p.* 189.—Dr. Withering ſays, the conſiderable and long continued heat and irritation, which it produces in the throat, when chewed, made me firſt think of giving it in a caſe of difficulty in ſwallowing, ſeemingly occaſioned by a paralytic affection. The patient was directed to chew a thin ſlice of the root, as often as ſhe could bear to do it, and, in about two months, ſhe recovered her power of ſwallowing. This woman bore the diſagreeable irritation and the ulcerations its acrimony occaſioned in her mouth with great reſolution; but ſhe was reduced to ſkin and bone and for three years before had ſuffered extremely from hunger without being able to ſatisfy her appetite; for ſhe ſwallowed liquids very imperfectly, and ſolid not at all. The complaint came on after lying-in.

It is eaten by ſheep and goats. Cows and horſes refuſe it.

DAPHNE *laureola. Spurge Laurel.* S. Apr. Hardwick. Matlock. Mr. Coke.

Very happy effects have been experienced from this plant in rheumatic fevers. It operates as a briſk and rather ſevere purgative. It is an efficacious medicine in worm caſes; and upon many accounts deſerves to be better known to phyſicians; but, in leſs ſkilful hands, it would be dangerous; as it is poſſeſſed of conſiderable acrimony. The whole plant has the ſame qualities, but the bark of the root is the ſtrongeſt. Dr. Alſton fixes the outſide doſe at 10 grains. Dr. Withering.

Order II.

DIGYNIA. II. POINTALS.

CHRYSOSPLENIUM *alternifolium. Alternate-leaved golden Saxifrage.* P. April.

Dethick. Mr. Hallows.—Chee Tor. Mr. Coke.

CHRYSOSPLENIUM *oppoſitifolium. Oppoſite-leaved golden Saxifrage.* P. April.

Pinxton. Nurſery near Mr. Eames's, Mackworth.

Order III.

TRIGYNIA. III. POINTALS.

POLYGONUM *biſtorta. Greater Knotgraſs. Snakeweed.* [*Meeks*, Derbyſhire.] July.

S. Normanton. Crich. In a meadow by Mr. Bennett's, Mackworth.

The root is one of the ſtrongeſt vegetable aſtringents. The young ſhoots are eaten in herb puddings in the north of England. Dr. Stokes.—The young leaves boiled and fried with bacon, are eaten by the common people in Derbyſhire. Pilk.

POLYGONUM *amphibium.* *Amphibious Knotgraſs. Perennial Willow-leaved Arſmart. Narrow-leaved Pondweed.* June.

Pinxton. Burdock pool, Derby.

POLYGONUM *hydropiper.* *Water Pepper. Arſmart. Lakeweed.* A. July.—Sept.

Not uncommon in watery places. Hardwick. Derby.

The whole plant has an acrid, burning taſte. It cures little aphthous ulcers in the mouth. It dyes wool yellow. The aſhes of this plant, mixed with ſoft ſoap, is a noſtrum, in a few hands, for diſſolving the ſtone in the bladder; but it may be reaſonably queſtioned whether it has any advantage over other ſemi-cauſtic preparations of the vegetable Alcali. Dr. Withering ſays, its acrimony riſes in diſtillation, and the diſtilled water, drank to the amount of 2 or 3 pints daily, has been found very effectual in ſome nephritic caſes.

Horſes, goats, ſheep, and ſwine refuſe it.

POLYGONUM *perſicaria.* *Dead or ſpotted Arſmart.* July.

Common in wet places.

Its taſte is ſlightly acid and aſtringent. With the aſſiſtance of a ſolution of alum this plant is ſaid to give a yellow colour to woollen cloth.

Goats, ſheep, and horſes eat it. Cows and ſwine refuſe it.

POLYGONUM *aviculare.* *Common Knot-graſs.* April.—Sept.

POLYGONUM *fagopyrum.* *Buck Wheat. Branks.* A. July. Aug.

Cheſterfield.

In ſome parts of England the whole plant, when fully grown, is ploughed into the ground and uſed as manure to the land.

Mr. Bartley of Briſtol ſays, *(Bath letters, and papers on agriculture, &c. v.* iii. *p.* 311.*)* buckwheat is become with me a favourite object of cultivation, being clearly of opinion, that it ought in numerous caſes to ſuperſede the uſe of ſummer fallowing; for the crop produced ſeems not only ſo much clear gain in reſpect to ſuch practice, but alſo affords a conſiderable quantity of ſtraw for fodder and manuring. Beſides I think a ſummer fallowing is not ſo advantageous a preparation for a ſucceeding crop.—From its quick aud luxuriant growth it is an admirable deſtroyer of weeds, and ſuits with a dry mellow ſoil, but flouriſhes moſt in a light ſand. It is impatient of wet and of cold. Horſes, poultry, and hogs are fond of it.—Dr. Withering ſays, cows, goats, and ſheep eat, but the laſt are ſaid to become unhealthy by living upon it.—There is reaſon to ſuppoſe that it may become an object of diſtillation.—The ſeeds are warm and nouriſhing, but the fleſh of poultry, which eat them, is ſaid to acquire a rank taſte.

POLYGONUM *convolvulus.* *Climbing black Bindweed.* A. June.—Sept.

Not uncommon; in corn fields and hedges.

Dr. Withering ſays, that the ſeeds are quite as good for uſe as thoſe of the preceding ſpecies, are produced in greater quantity, and that the plant bears cold better.

Cows and goats eat it. Sheep and ſwine refuſe it. Horſes are not fond of it.

Order IV.

TETRAGYNIA. IV. POINTALS.

ADOXA *moſchatellina.* *Tuberous Moſchatel.*

Woods and ſhady places.—Dethick. Mr. Hallows.—Love lane, Derby. Mr. Whately.—Nurſery by Mr. Eames's, Mackworth. P. Apr.

Goats eat it. Cows refuſe it.

PARIS *quadrifolia.* *Herb Paris. Truelove. One-berry.* S. P. April. May.

Pinxton. Newton wood. Mr. Coke.—Love lane, near Derby. Mr. Whately.—In Longford long lane, in a pit near Dalbury Lees.

Dr. Withering obſerves, the leaves and berries are ſaid to partake of the properties of opium. The juice of the berries is uſeful in inflammations of the eyes. Linnæus ſays the root will vomit as well as ipecacuanha, but it muſt be given in a double quantity. Dr. Stokes remarks, the berries give out, on infuſion in water, a purpliſh red, which an acid turns to a bright florid red, and an alkali to a bluiſh green.—Goats and ſheep eat it. Cows, horſes, and ſwine refuſe it.

Claſs X.

DECANDRIA *DIGYNIA.*

X. CHIVES. *II. POINTALS.*

SAXIFRAGA *cæſpitoſa.* *Matted Saxifrage.*
Caſtleton hill. Mr. Coke. P. June.

SAXIFRAGA *tridactylites.* *Rue-leaved Saxifrage.* *Rue Whitlow-graſs.*
Buxton. A. April.

It was formerly infuſed in beer, and drank for a long time was ſaid to cure the king's evil

SAXIFRAGA *granulata*. *White Saxifrage.*
Caſtleton. Edenſor. Mr. Coke.—Near Swarkeſton bridge. P. June.

SAXIFRAGA *hypnoides*. *Trifid or Moſs Saxifrage. Ladies Cuſhion.* P. July.
Caſtleton. Mr. Coke.—Middleton dale. Mr. Whately.—Dovedale. Mr. Woodward.

It is cultivated in our garden as an edging for borders.

DIANTHUS *arenarius*. *Common Pink.*
Near Edenſor. Mr. Coke. P. July.

DIANTHUS *deltoides*. *Maiden Pink.*
Hills between Bakewell and Chatſworth. Mr. Whately.

SAPONARIA *officinalis*. *Soapwort. Bruiſewort.* July.
Elmeton. Mr. Hallows.—Duffield.

The whole plant is bitter. Bruiſed and agitated with water it raiſes a lather like ſoap, which waſhes greaſy ſpots out of cloaths. Dr. Withering ſays, that a decoction of it applied externally cures the itch; and that the Germans uſe it inſtead of ſarſaparilla in venereal complaints. M. Andry of Paris, cures virulent gonorrhœas, by giving half an ounce of the inſpiſſated juice daily.

Order III.

TRIGYNIA. III. POINTALS.

CUCUBALUS *behen*. *Spattling Poppy. White Bottle. Bladder Campion.*

Not uncommon in dry ſituations. At Doveridge, Pinxton, Derby. June.—Aug.

The leaves boiled have ſomething of the flavour of peaſe, and proved of great uſe to the inhabitants of the iſland of Minorca, in the year 1685, when a ſwarm of locuſts had deſtroyed the harveſt. The Gothlanders apply the leaves to eryſipalous eruptions.

Cows, ſheep, and goats eat it. Horſes are not fond of it.

SILENE *nutans*. *Nottingham Catchfly.*

Middleton dale. Mr. Coke.—Rocks in Dovedale. Mr. Woodward. P. Aug.

Sheep, horſes, goats, and ſwine eat it. Cows refuſe it.

STELLARIA *holoſtea*. *Greater Stichwort.*

Frequent in hedges, at Pinxton, Derby, Duffield, and Mackworth. P. May.

STELLARIA *graminea*. *Leſſer Stichwort.*

Not uncommon at Pinxton and Derby. July.

Horſes, cows, goats, ſheep, and ſwine eat it.

ARENARIA *trinervia.* *Plantain-leaved Sandwort.* A. May.—July.

S. Normanton. Mr. Coke.

ARENARIA *ſerpyllifolia.* *Thyme-leaved Sandwort.* A. May.—July.

S. Normanton. Mr. Coke.

ARENARIA *ſaxatilis.* *Mountain Sandwort.*

Middleton dale. Mr. Coke. June.

ARENARIA *verna.* *Mountain Sandwort.*

Matlock. Mr. Woodward. Pilk. P. May.

ARENARIA *laricifolia.* *Larch-leaved Sandwort.* P. June.

Middleton dale. Crich. Mr. Coke.

Order V.

PENTAGYNIA. V. POINTALS.

SEDUM *telephium.* *Stone-crop. Orpine. Live-long.* P. Auguſt.

Dethick. Mr. Hallows.—Dovedale. Mr. Whately.

Cows, goats, ſheep, and ſwine eat it. Horſes refuſe it. Linn.—A decoction of the leaves in milk is a forcible diuretic. It has been given with ſucceſs to cure the piles. Dr. Withering.

SEDUM *daſyphillum.* *Thick or round-leaved Stone-crop.* P. Auguſt.

Pinxton. Mr. Coke.

SEDUM *acre.* *Stone-crop.* *Wall Pepper.*

Frequent on roofs of houſes at Derby, Makeney, and S. Normanton. P. June and July.

This plant continues to grow, when hung up by the root, which is a proof that it receives its nouriſhment principally from the air, as is the caſe with moſt of the ſucculent plants. It is very acrid. Applied externally it bliſters. Taken inwardly it excites vomiting. In ſcorbutic caſes and quartan agues it is an excellent medicine under proper management. Dr. Withering.——Goats eat it. Cows, horſes, ſheep, and ſwine refuſe it.

SEDUM *reflexum.* *Yellow Stone-crop.*

Walls, roofs, and rocks. Derby, Horſley caſtle, and Alfreton. July.

OXALIS *acetoſella.* *Wood Sorrel.* *Cuckow-meat.* P. April.

Frequent in ſhady places.

The leaves and flowers contain a pleaſant acid. The London college directs a conſerve to be made of the leaves, beaten with thrice their weight of fine ſugar. The expreſſed juice depurated, properly evaporated, and ſet in a cool place, affords a cryſtalline acid ſalt, in conſiderable quantity, which may be uſed, whenever vegetable acids are wanted. It is employed to take iron moulds out of linen, and is ſold under the name of eſſential ſalt of lemons. Dr. Withering.—An infuſion of the leaves is an agreeable liquor in ardent fevers, and boiled with milk they make a pleaſant whey. Lewis.

Sheep, goats, and ſwine eat it. Cows are not fond of it. Horſes refuſe it.

AGROSTEMMA *githago. Cockle.* A. June.
In corn fields, but not very frequent.
Horſes, goats, and ſheep eat it.

LYCHNIS *flos cuculi. Meadow Pinks. Wild Williams. Cuckow-flower. Ragged Robin.*
Frequent in meadows and paſtures. P. June.
Horſes, ſheep, and goats eat it.

LYCHNIS *dioica. Red and White Campion.*
The red frequent in dry and moiſt places, but the white not very common. P. May. June.

CERASTIUM *vulgatum. Common mouſe-eared Chickweed.* P. June.
Aſhover moors. Derby.

CERASTIUM *ſemidecandrum. Leaſt mouſe-eared Chickweed.* A. April.—Aug.
Pinxton. Mr. Coke.

CERASTIUM *tomentoſum. Woolly Mouſe-ear.* Kedleſton. Mr. Hadley. July.

CERASTIUM *aquaticum. Marſh Mouſe-ear.*
Siddals, near Derby. P. July.

Spergula *arvenſis.* *Corn Spurrey.*
S. Normanton. A. July.

Poultry are fond of the ſeeds; and the inhabitants of Finland and Norway make bread of them, when their crops of corn fail. Dr. Withering ſays, experience ſhews it to be very nutritious to the cattle, that eat it.—Horſes, ſheep, goats, and ſwine eat it. Cows refuſe it.

Claſs XI.

DODECANDRIA *MONOGYNIA.*

XII. CHIVES. I. *POINTAL.*

Lythrum *ſalicaria.* *Purple Looſeſtriſe, or purple-ſpiked Willowherb.* P. Aug.
Bakewell meadow. Sinfin moor. Coxbench.
Horſes, cows, ſheep, and goats eat it.

Order II.

DIGYNIA II. POINTALS.

Agrimonia *eupatoria.* *Common Agrimony.*
P. June. July.
Very common in hedges and road ſides.

It is a mild corroberant, and is employed againſt habitual diarrhæas. Dr. Withering obſerves, the Canadians are ſaid to uſe an infuſion of the root in burning fevers and with great ſucceſs. An infuſion of 6 ounces of the crown of the root, in a quart of boiling water, ſweetened with honey, and half a pint of it drank three times a day, Dr. Hill ſays, is an effectual cure for the jaundice. He adviſes to begin with a vomit, afterward to keep the bowels ſoluble, and to continue the medicine as long as any ſymptoms of the diſeaſe remain.—Sheep and goats eat it. Cows and ſwine refuſe it. Horſes are not fond of it.

Order III.

TRIGYNIA. III. POINTALS.

RESEDA *luteola.* *Dyers-weed, Wild Woad, Yellow-weed.* A June. July.

Pinxton, Cheſterfield, Matlock, Duffield, Alleſtry, and Derby.

This plant affords a moſt beautiful yellow dye for cotton, woollen, mohair, ſilk and linen, and on account of the excellenee of its colour is commonly uſed by the dyers. A decoction of it turns blue cloths green. The yellow colour of the paint, called dutch pink, is obtained from this plant. Dr. Withering ſays, the tinging quality reſides in the ſtems and roots, and it is cultivated in ſandy ſoils, rich ſoil making the ſtalk hollow and not ſo good. It is generally ſuppoſed to be the plant, with which the Picts, the antient inhabitants of Britain, painted their bodies.—Cattle will not eat it, but ſheep ſometimes browſe it a little.

EUPHORBIA *exigua.* *Dwarf ſpurge.*
Corn fields. Pinxton. A. July.
EUPHORBIA *peplus.* *Petty ſpurge.*
Derby. Mr. Hadley. A. June.
EUPHORBIA *Amygdaloides.* *Wood ſpurge.*
Chaddeſden common. Mr. Hadley. July.
EUPHORBIA *helioſcopia.* *Sun ſpurge.*
Wartwort, or Churn-ſtaff. A. July.
Derby. Pinxton.

If ſheep eat it, they are purged by it, and their fleſh gets a bad taſte; but this is not the caſe with cows.

Order VII.

DODECAGYNIA. XII. POINTALS.

SEMPERVIVUM *tectorum.* *Common Leek.*
Cyphel. June. July.
Frequent on roofs and old walls.

The juice either applied by itſelf or mixed with cream gives preſent relief in burns and other external inflammations. Mixed with honey it is an uſeful application in aphtous caſes. Dr. Withering.

Claſs XII.

Scarcely any of the plants of this claſs are poiſonous. The fruits are moſtly pulpy and eſculent.

ICOSANDRIA *MONOGYNIA.*

XX. CHIVES. *I. POINTAL.*

Prunus *inſititia*. *Black Bullace-tree.* Hedges, but not very common. Pinxton.
T. April.

The bark of the roots and branches is conſiderably ſtiptic. Dr. Withering ſays an infuſion of the flowers, ſweetened with ſugar, is a mild purgative, not improper for children. The fruit is ſour, but, when it is mellowed by froſts, is not unpleaſant.

Prunus *ceraſus*. *Common Wild Cherry-tree.* T. May.
Glapwell. Mr. Coke.—Mackworth.

The gum, which exſudes from this tree, is equally valuable with gum arabic. Haſſelquiſt relates, that more than 100 men, during a

ſiege,

ſiege, were kept alive for near two months without any other ſuſtenance than a little of this gum taken into the mouth ſometimes, and ſuffered gradually to diſſolve.—The fruit is frequently infuſed in brandy for the ſake of its flavour.—The wood is hard and tough. It is uſed by the turner, and is formed into chairs and ſtained to imitate mahogany. This tree is the original ſtock from which many of the cultivated kinds are derived. Linnæus.

PRUNUS *avium. Black Cherry-tree. Mazzards.* T. May.

Pinxton. Derby.

It grows beſt unmixed with other trees. It bears cropping, and ſuffers the graſs to grow under it.

PRUNUS *padus. Birds Cherry. Wild Cluſter Cherry.* S. June.

Chee Tor. Matlock. Mr. Coke.

The fruit is nauſeous, but bruiſed and infuſed in wine or brandy, it is thought to give it an agreeable flavour. A ſtrong decoction of the bark is uſed by the Finlanders to cure venereal complaints; and a decoction of the berries is ſometimes given with ſucceſs in the dyſentery. The wood being ſmooth and tough is made into handles for knives and whips.

Sheep, goats, and ſwine eat it. Cows are not fond of it. Horſes refuſe it.

PRUNUS *ſpinoſa*. *Black-thorn. Sloe-tree.* Frequent in hedges. S. March. Apr.

When it is planted in hedges, it is apt to ſpread and encroach upon the neighbouring ground.—The wood is hard and tough, and is formed into teeth for rakes, and walking ſticks. The thorns are ſaid to have ſomething of a poiſonous nature in the autumn. The tender leaves have been uſed and recommended as a ſubſtitute for tea. An infuſion of a handful of the flowers is a ſafe and eaſy purge. The bark powdered, in doſes of two drams, will cure ſome agues. Letters written upon linen or woollen, with the juice of the fruit, will not waſh out.

Sheep, goats, and horſes eat it.

Order II.

DIGYNIA. II. POINTALS.

CRATÆGUS *aria*. *White Haw or Beam-tree.* T. May.

Matlock. Mr. Coke.—Mountainous parts of Derbyſhire, from the fiſſures of the precipices, without any appearance of ſoil. Mr. Woodward.—He alſo obſerves that it is here called the wild pear-tree.

It loves an open and high ſituation, bears lopping, and permits the graſs to grow.—The wood being hard, tough, and ſmooth, is uſed for axle-trees, wheels, walking-ſticks, carpenters, and other tools.—The fruit is eatable, when mellowed by the autumnal froſts, and an ardent ſpirit may be diſtilled from it. It ſeldom bears a good crop of fruit two years together.—Sheep and goats eat it.

CRATÆGUS *monogyna.* *White-thorn. Haw-thorn.* T. May.

It is preferred on a variety of accounts to every other Engliſh plant for making hedges. In Derbyſhire it is alſo ſuffered to grow ſingle in parks, and pleaſure grounds, to which it is a beautiful ornament, more eſpecially when it is in bloſſom. It does not flouriſh in a high ſituation or barren ſoil. It is therefore not much uſed, in the mountainous parts of Derbyſhire, for making hedges.

Order III.

TRIGYNIA. III. POINTALS.

SORBUS *aucuparia.* *Mountain Service. Aſh or Quicken-tree.* T. May.

Not uncommon in woods and hedges.

It will not bear lopping, and does not hinder the growth of other plants.—The wood, which is ſoft, tough, and ſolid, is converted into tables, ſpokes for wheels, ſhafts, chairs, &c. The roots are formed into handles for knives, and wooden ſpoons.—The berries dried and reduced to powder, make wholeſome bread; and an ardent ſpirit may be diſtilled from them, which has a fine flavour; but it is ſmall in quantity. The berries infuſed in water make alſo an acid liquor, ſomewhat like perry, which is drank by the poorer people in Wales. Dr. Withering.

SORBUS *domeſtica.* *True Service or Sorb-tree.* T. June.

Crich woods. Matlock. Mr. Coke.

The fruit is mealy and auſtere, not much unlike the medlar.—The wood is ſaid to be valuable for making mathematical rulers, and exciſemens gauging ſticks.

Order IV.

PENTAGYNIA. V. POINTALS.

PYRUS *communis.* *Common Pear Tree.*

Matlock. Mr. Coke.—Morley lime, between Morley and Stanley. T. May.

It ſtands the ſevereſt winters and does not deſtroy the graſs. The wood is light, ſmooth, and compact. It is uſed by turners, and to make joiners tools; and for picture frames, to be ſtained black. The leaves afford a yellow dye, and may be uſed to give a green to blued cloaths.—The fruit is auſtere; but, when cultivated, highly grateful, as is proved by the great variety of excellent pears, which the induſtry of mankind has raiſed; for they all originate from this.—Horſes, cows, ſheep, and goats eat the leaves.

PYRUS *malus.* *Crab-tree.* *Wilding.*

Frequent in woods and hedges. T. May.

Graſs, and even corn, will grow beneath it. It is much uſed as a ſtock, on which to engraft the better kinds of apples; becauſe its roots are neither killed by froſt, nor eaten by field-mice.—The bark affords a yellow dye. The wood is tolerably hard; it turns very clean, and, when made into cogs for wheels, obtains a poliſh, and wears a long time. The juice of the fruit, which is very acid and auſtere, is called verjuice, and is much uſed in recent ſprains, and in other caſes as an aſtringent or repellent. In Derbyſhire it is frequently uſed with ſugar and melted butter, as a ſauce to puddings, and is known by the name of dip. Dr. Withering thinks, that with a proper addition of ſugar, it is probable, that a very grateful liquor might be made with the juice, but little inferior to old hock.

Horſes, cows, ſheep, and goats eat it. Swine are very fond of the fruit. Linn.

A decoction of the inner bark is ſaid to be a good ſubſtitute for Peruvian bark.

SPIRÆA *ulmaria*. *Meadowſweet. Queen of the meadows.* P. June. July.

Frequent in moiſt places. Pinxton. Duffield. Siddals, near Derby.

The flowers infuſed in boiling water give it a fine flavour, which riſes in diſtillation.—— Sheep and ſwine eat it; goats are extremely fond of it; horſes and cows are indifferent to it. It is ſaid, that the latter eat it, when they have the yellows.

Order V.

POLYGYNIA. MANY POINTALS.

ROSA *rubiginoſa*. *Sweet-briar.*
Paſtures at Rough Heanor near Mickleover.
S. June. July.

ROSA *arvenſis*. *White-flowered Dogs Roſe.*
Common in hedges. S. July.

ROSA *canina.* *Dogs Roſe.* *Hep Tree.* S. June.

A perfumed water may be diſtilled from the bloſſoms. The pulp of the berries, beat up with ſugar, makes the conſerve of the heps of the London diſpenſatory. Mixed with wine it is an acceptable treat in the north of Europe. The leaves of every ſpecies of roſe, but eſpecially of this, are recommended in the *Eph. nat. curioſor.* as a ſubſtitute for tea, giving out a fine colour, a ſub-aſtringent taſte, and a grateful ſmell, when dried, and infuſed in boiling water.—Cows, ſheep, goats, and ſwine eat it. Horſes are not fond of it.

ROSA *ſpinoſiſſima.* *Burnet Roſe.* *Pimpernell Roſe.* S. June.

Hedges and paſtures at Rough Heanor. Pilk.

The ripe fruit is eaten by children; it has a grateful ſub-acid taſte. The juice of it, diluted with water, dyes ſilk and muſlin of a peach colour; and with the addition of alum a deep violet; but it has very little effect on woollen or linen.—Cows, ſheep, goats, and ſwine eat it. Horſes refuſe it.

ROSA *villoſa.* *Apple Roſe.* S. May. June.

In ſeveral hedges about Hatherſage. Mr. J. Martin.*—In paſtures at Rough Heanor. Pilk.

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* Account of rare plants in Derbyſhire in phil. tranſ. abridged. No. 407. p. 22 Jan. 1729.

An infuſion of the full blown bloſſoms of all the roſes, eſpecially the paler kinds, is purgative; but the petals of the red, gathered before they expand and dried, are aſtringent.

RUBUS *idæus*. *Raſpberry Bramble*. May.

Pleaſly, Darley, Chapel le frith, and in moſt other parts of the Peak.

The fruit is agreeable and cooling. It is ſaid to diſſolve the tartarous concretions of the teeth.

Sheep, goats, and ſwine eat the leaves. Cows are not fond of them. Horſes ſeem indifferent to them.

RUBUS *fruticoſus*. *Bramble*. *Black-berry Buſh*. Common in hedges. S. June.

Children eat the berries. In Lancaſhire wine is ſometimes made from the juice of them with a certain proportion of ſugar.

RUBUS *chamæmorus*. *Cloud-berries*. *Knot-berries*. *Knout-berries*. P. May. June.

Dr. Leigh, in his natural hiſtory, p. 94. places it amongſt the ſcarce plants of Derbyſhire. I believe, that it grows at the head of the valley of Edale, and near the foot of the mountain called Kinderſcout. At leaſt I have had a plant deſcribed to me and found in this ſituation, which ſeems to be the cloud-berry.

Dr. Leigh ſays, it is a fruit of a pleaſant taſte, and a good antiſcorbutic. Dr. Withering informs us, that the Norwegians pack them up in wooden veſſels and ſend them to Stockholm, where they are ſerved up in deſerts, or made into tarts. The Laplanders bury them under the ſnow, and thus preſerve them freſh from one year to another. They bruiſe and eat them with the milk of the rein-deer. In the highlands of Scotland alſo they are ſometimes brought to table with the deſert.

Cows, ſheep, and goats eat it.

RUBUS *ſaxatilis*. *Stone Bramble*. P. June.

Hills oppoſite Matlock Bath. Mr. Woodward.

The berries are not very good, but children eat them.—Cows, goats, ſheep, and ſwine eat it. Horſes refuſe it.

FRAGARIA *veſca*. *Wood Straw-berry*.

Frequent in the Peak. P. May.

The fruit is univerſally pleaſant. It promotes perſpiration, and diſſolves the tartarous encruſtations on the teeth. Dr. Withering obſerves, that people afflicted with the gout or ſtone have found great relief by uſing them largely; and Hoffman ſays, he has known conſumptive people cured by them. The bark of the root is aſtringent.

Sheep and goats eat it. Cows are not fond of it. Horſes and ſwine refuſe it.

FRAGARIA *ſterilis.* *Barren Straw-berry.* Not uncommon in barren places P. April.

POTENTILLA *anſerina.* *Silver-weed. Wild Tanſey.* P. June.

Sinfin moor, Derby, Hartington Common.

The leaves are mildly aſtringent. Dried and powdered they are given with ſucceſs in agues. The uſual doſe is a meat ſpoonful of the powder every three hours between the fits. The roots, in the winter-time, in taſte reſemble parſneps. Swine are fond of them. Dr. Withering.—Cows, horſes, goats, and ſwine eat it. Sheep refuſe it.

POTENTILLA *reptans.* *Common Cinquefoil.* Frequent. P. June.

The red cortical part of the root is mildly aſtringent and antiſeptic. Dr. Withering ſays, a decoction of it is a good gargle for looſe teeth and ſpongy gums.—Horſes, cows, goats, and ſheep eat it.

TORMENTILLA *erecta.* *Common Tormentil. Septfoil.* P. June.—Aug.

Pinxton, Normanton, Buxton, Radbourn Common.

The roots may be ranked with the ſtrongeſt vegetable aſtringents, and as ſuch have a place in the modern practice of phyſic. Farmers find them very efficacious in the dyſenteries of cattle. They are uſed in ſeveral countries to tan leather. They dye red. Dr. Withering. Cows, goats, ſheep, and ſwine eat it. Horſes refuſe it.

GEUM *urbanum*. *Common Avens. Herb Bennet.* June.

Frequent in woods and hedges, and on road ſides.

The roots, gathered in the ſpring, before the ſtems grow up, and put into ale, give it a pleaſant flavour, and prevent its growing ſour. Infuſed in wine it is a good ſtomachic. Its taſte is mildly auſtere and aromatic, eſpecially when it grows in warm dry ſituations; but in ſhady moiſt places it has little virtue.—Cows, goats, ſheep, and ſwine eat it. Horſes are not fond of it.

GEUM *rivale*. *Water Avens*. P. June.

Chee Tor. Haſſop. Pinxton. Mr. Coke.

The powdered root will cure tertian agues, and is daily uſed for that purpoſe by the Canadians. Dr. Withering.—It is made uſe of to cure ropy malt liquor. Dr. Stokes.

Sheep and goats eat it. Cows, horſes, and ſwine are not fond of it.

Claſs XIII.

The plants of this claſs are in general poiſonous.

POLYANDRIA *MONOGYNIA.*

MANY CHIVES. I. *POINTAL.*

CHELIDONIUM *majus*. *Greater Celandine.*

Matlock, Little Eaton, and the church yard at Mackworth. P. May.

The juice of every part of this Plant is very acrimonious. It cures warts, tetters, and ringworms. Diluted with milk it conſumes white opake ſpots upon the eyes; but it muſt be made very weak, before it can be applied with ſafety to ſo tender an organ. It is ſeldom given internally. Dr. Withering ſays, there is no doubt, but a medicine of ſuch activity will one day be converted to more important purpoſes.

PAPAVER *rhœas*. *Red Poppy*. A. July.

Amongſt corn. Chaddeſden. Oſmaſton.

An infuſion of the bloſſoms made into a ſyrup is kept in the ſhops. It partakes in a ſmall degree of the properties of opium, and ſtands recommended in catarrhs, coughs, ſpitting of blood, and other diſorders. Sheep and goats eat it. Horſes refuſe it.

TILIA *europæa.* *Lime-tree. Linden-tree.* Woods and hedges. Pleaſly Park. T. July.

It flouriſhes beſt on the ſides of hills, but it will live very well in meadow ground. It is eaſily tranſplanted, and graſs grows beneath it. It is uſeful to form ſhady walks, and clipped hedges. The wood is ſoft, light, and ſmooth; cloſe-grained and not ſubject to worms. It makes good charcoal for gunpowder and deſigners.—The leaves are dried in ſome countries as winter food for ſheep and goats. Cows eat them in the autumn; but they give a bad taſte to the milk. The bark macerated in water may be made into ropes and fiſhing nets. The flowers are fragrant, and afford the beſt honey for bees. The ſap inſpiſſated affords a quantity of ſugar. Dr. Withering.

CISTUS *helianthemum.* *Dwarf Ciſtus. Little Sun-flower.* P. June. July.

Middleton dale. Mr. Coke.—Matlock rocks. Dr. Johnſon.—Aſhover and Clown.

NYMPHÆA *lutea.* *Yellow Water Lily.* June.

Trent and Wingerworth ponds. Mr. Coke. In deep pits of water near Swarkeſton bridge.

Swine eat it. Goats are not fond of it. Cows, ſheep, and horſes refuſe it. Linn.—An infuſion of a pound of the freſh root to a gallon of water, taken in the doſe of a pint, night and morning, cured a leprous eruption of the arm. Dr. Withering.

NYMPHÆA *alba.* *White Water Lily.*

Hardwick and Wingfield ponds. Mr. Coke. In a piece of water near Weſton cliff. P. July.

This plant raiſes itſelf every morning out of the water, and opens its flowers, ſo that by noon at leaſt three inches of its flowerſtalk may be ſeen above the ſurface. In the evening it is cloſely ſhut up and withdrawn again; for about four o'clock in the afternoon the flower cloſes and remains all night under water. Linn.—The roots are uſed in Ireland and in the iſland of Jura, to dye a dark brown.—Swine eat it. Goats are not fond of it. Cows and horſes refuſe it.

Order V.

PENTAGYNIA. V. POINTALS.

AQUILEGIA *vulgaris.* *Common Columbine.*

Monſale. Matlock. Pleaſly park. Mr. Coke. P. June.

On account of its beauty it has long had a place in our gardens.

Goats eat it, ſheep are not fond of it. Cows, horſes, and ſwine refuſe it.

Order VII.

POLYGYNIA. MANY POINTALS.

ANEMONE *nemoroſa.* *Wood Anemone.*

Frequent in woods and hedges. P. Apr. May.

The flowers fold up in a curious manner againſt rain. The whole plant is acrid. Dr. Withering ſays, when ſheep, unaccuſtomed to it, eat it, it brings on a bloody flux.—Goats and ſheep eat it. Horſes, ſwine, and cows refuſe it.

THALICTRUM *minus.* *Leſſer Meadow-Rue.*

Near the cave at Caſtleton. Mr. J. Martin. July.

THALICTRUM *flavum.* *Meadow-Rue.*

Alfreton and Pleaſly brooks. Mr. Coke.—Banks of the Derwent near Duffield church; and below Derby. P. June.

A cataplaſm, made of the leaves, has been known to give relief in the Sciatica. The root dyes wool yellow.—Cows, horſes, goats and ſheep eat it. Swine are not fond of it.

ADONIS *autumnalis.* *Pheaſant-eye. Adonis Flower.* A. June. July.

In the fields, but not very common. Dr. Johnſon.

RANUNCULUS *flammula.* *Procumbent Crowfoot or Spearwort.* P. June. July.

Moiſt ſituations, Pleaſly, Duffield, and Derby.

It is very acrid. Applied externally it inflames, and bliſters the ſkin.—Horſes eat it. Cows, ſheep, goats, and ſwine refuſe it.

RANUNCULUS *lingua.* *Upright or Great Spearwort.* P. June. July.

S. Normanton. Mr. Coke.

RANUNCULUS *bulboſus.* *Bulbous Crowfoot. Butter-cups.* June. July.

Meadows and paſtures.

Cows and horſes have a great averſion to it.

RANUNCULUS *hirſutus.* *Pale-leaved Crowfoot.* A. June. Sept.

Not unfrequent near Derby.

RANUNCULUS *repens.* *Butter-cups. Creeping Crowfoot.* Not uncommon. P. June. Aug.

RANUNCULUS *acris.* *Common or Upright Crowfoot. Butter-cups.* P. June. July.

Meadows and paſtures.—Sheep and goats eat it. Cows, horſes, and ſwine refuſe it.—It is very acrid, and bliſters the ſkin.

RANUNCULUS *arvenſis.* *Corn Crowfoot.*

Northwingfield dam. Mr. Coke. A. July.

RANUNCULUS *hederaceous.* *Ivy-leaved Crowfoot.* P. June. Sept.

S. Normanton Common; by the ſide of the

London road, Derby; and near Mr. Bennet's, Mackworth.

Ranunculus *aquatilis. Water Crowfoot.*

S. Normanton common. Siddals near Derby. Markeaton brook.—Cows, horſes, goats, ſheep, and ſwine eat it.

Ficaria *verna. Leſſer Celandine, or common Pilewort.* P. April.

Very common in meadows and paſtures.

The young leaves may be eaten in the ſpring along with other pot-herbs.—Goats and ſheep eat it. Cows and horſes refuſe it.

Caltha *paluſtris. Marſh Marigold. Meadow-bouts.* P. April. May.

Moiſt meadows and paſtures.

The juice of the flower leaves, boiled with a little alum, ſtains paper yellow. Dr. Withering ſays, that the flowers gathered before they expand, and preſerved in ſalted vinegar, are a good ſubſtitute for capers.—Goats and ſheep eat it. Cows, horſes, and ſwine refuſe it.

Helleborus *fœtidus. Stinking Hellebore. Bearsfoot. Setterwort.* P. April.

Cromford Moor. Mr. Coke.—Dethick. Mr. Hallows.—The dried leaves are frequently given to children to deſtroy worms, but they muſt be uſed ſparingly, being violent in their operation. Inſtances of their fatal effects are recorded. A decoction of one or two drams, either of this or of the following ſpecies, is a ſharp purge. Dr. Withering.

HELLEBORUS *viridis.* *Green-flowered Hellebore.* P. April.

Matlock. Codnor Caſtle. Mr. Coke.

Claſs XIV.

The plants in the firſt order of this claſs are oderiferous, cephalic, and reſolvent. None of them are poiſonous.

DIDYNAMIA *GYMNOSPERMIA.*

II. CHIVES LONGER. *SEEDS NAKED.*

TEUCRIUM *ſcorodonia.* *Wood Sage.* P. July.

Frequent in the northern part of the county.

An infuſion of this plant is a uſeful bitter. A tea cupfull drank cold, night and morning, is ſaid to ſtrengthen the ſtomach, and promote digeſtion.

AJUGA *reptans.* *Common Bugle.*

Not uncommon in paſtures. P. May. July.

The roots are aſtringent.

BETONICA *officinalis*. *Wood Betony*. July. Pinxton, Alleſtry, and Horſley Caſtle.

This plant was formerly much uſed in medicine, but it is in a great meaſure diſcarded from modern practice. The leaves powdered and ſnuffed up the noſe, excite ſneezing. This effect is ſaid to be owing not to any ſtimulating quality of the herb, but to the rough hairs with which the leaves are covered. It is aſſerted by ſome writers, that betony affects thoſe who gather it with a diſorder, reſembling drunkenneſs.—It is one of the ingredients in the Britiſh herb tobacco.—The root provokes vomiting.—Sheep eat it. Goats refuſe it.

VERBENA *officinalis*. *Vervain*. *Simpler's Joy*. Quarndon; Morley; Mackworth, near Mr. Bennet's and the church. P. July.

It is ſlightly aſtringent. The root, worn at the pit of the ſtomach, an infuſion, and an ointment prepared from the leaves, are ſaid to produce good effects in ſcrophulous complaints; *(Morley's eſſay on ſcrophula;)* but Dr. Withering ſays this wants confirmation from the more rational and leſs enthuſiaſtic practitioner. Miller ſays, it is never found more than a quarter of a mile from a houſe, which is the reaſon of the common Engliſh name mentioned above.—Sheep eat it. Cows and goats refuſe it. Horſes will ſometimes eat it.

MENTHA *aquatica. Water Mint.* P. Aug. Common.—Horſes eat it. Swine refuſe it.

MENTHA *ſativa. Marſh Mint.* P. July. Common.

MENTHA *longifolia. Long-leaved Horſe Mint.* Pinxton. Mr. Coke. July.

MENTHA *piperita. Pepper Mint.* P. July. South Normanton.—The ſtem and leaves are beſet with numbers of very minute glands, containing the eſſential oil, which riſes plentifully in diſtillation. The pepper mint water is well known as a carminative and anti-ſpaſmodic. Dr. Withering obſerves, Junipers eſſence of pepper mint is an elegant medicine, and poſſeſſes the moſt active properties of the plant.

MENTHA *arvenſis. Field Mint.* P. Aug. Not uncommon.——When eaten in large quantity by cows, from extreme hunger, it is ſaid to prevent their milk from yielding curd.—Horſes and goats eat it. Sheep are not fond of it. Cows and ſwine refuſe it.

MENTHA *pulegium. Pennyroyal.* P. Aug. Pinxton. Mr. Coke. Ockbrooke, Radbourn, and Langley commons.

The leaves boiled, and the liquor made into a ſyrup with ſugar, has given relief in very obſtinate coughs. Dr. Withering thinks it no bad medicine in the hooping cough.—This plant has conſiderable anti-ſpaſmodic properties, and an infuſion of it has been found uſeful in hyſterical affections.

GLECOMA *hederacea.* *Gill, Ground-Ivy, Robin run in the hedge.* P. April. May.

An infuſion of it is ſaid to be antiſcorbutic. Dr. Withering ſays, that the expreſſed juice, mixed with a little wine, and applied morning and evening, deſtroys the white ſpecks upon the eyes of horſes.—Sheep eat it. Horſes are not fond of it. Cows, goats, and ſwine refuſe it.

LAMIUM *album.* *White Dead Nettle. White Archangel.* P. May. June.

Common on ditch banks and rubbiſh.

Goats and ſheep eat it. Cows are not fond of it. Horſes and ſwine refuſe it.

LAMIUM *purpureum.* *Red Dead Nettle.*

Goats, ſheep, and horſes eat it. Cows refuſe it.—The young ſhoots are ſometimes eaten with other pot herbs.

GALEOPSIS *ladanum.* *Narrow-leaved Nettle.* Pinxton. P. June. Aug.

Goats and cows eat it. Sheep are not fond of it. Horſes refuſe it.

GALEOPSIS *tetrahit.* *Common Nettle-Hemp.* Pinxton, Derby. A. July.

Sheep and goats eat it. Horſes, cows, and ſwine refuſe it.

GALEOBDOLON *luteum.* *Yellow Archangel. Yellow Dead Nettle.* P. May.

In moiſt and ſhady places. Pinxton. Derby. Duffield. Park Hall.

STACHYS *ſylvatica.* *Hedge Nettle.*

Frequent. Derby; Pinxton. P. July.

Sheep and goats eat it. Horſes, cows, and ſwine refuſe it.—It will dye yellow.—The whole plant has a fœtid ſmell.

STACHYS *arvenſis.* *Corn Stachys.*

Frequent in corn fields. Pinxton.

A. June.—Aug.

STACHYS *germanica.* *German Stachys, or Baſe Horehound.* Pinxton. Mr. Coke. P. July.

BALLOTA *nigra.* *Stinking or Black Horehound.* In hedges. Pinxton. P. July.

It is ſaid to be uſeful in hyſterical caſes.

MARRUBIUM *vulgare.* *White Horehound.* Middleton dale. Derby. P. July.

It is very bitter, and was a favourite medicine with the ancients in obſtructions of the viſcera. In large doſes it is laxative. Dr. Withering ſays, that it is a principal ingredient in the Negro Cæſar's remedy for vegetable poiſons.—A young man, who had occaſion to take mercurial medicines, was thrown into a ſalivation, which continued for more than a year. Every method, which was tried to remove it, rather encreaſed the complaint. At length Linnæus preſcribed an infuſion of this plant, and the patient got well in a ſhort time. —Horſes, cows, ſheep and goats refuſe it.

LEONURUS *cardiaca.* *Motherwort, or Lion's Tail.* July.

Handley, Mr. Coke. Mackworth.

The leaves have a ſtrong, but not an agreeable ſmell, and bitter taſte.—Goats, ſheep, and horſes eat it. Cows are not fond of it. Swine refuſe it.

CLINOPODIUM *vulgare.* *Wild Baſil.* Aug.

Pinxton; Glapwell; Bolſover; and Chaddeſden turnpike.

ORIGANUM *vulgare.* *Wild or Field Marjoram.* P. July. Aug.

Matlock; Crich; Mr. Coke. Dovedale; Dr. Johnſon. And near Clown.—The whole plant is a warm aromatic. Infuſions of the leaves and flowering tops are ſometimes drank in tea, in weakneſs of the ſtomach, diſorders of the breaſt, for promoting perſpiration, and the fluid ſecretions in general.

Marjoram is ſo acrid, that it may be conſidered as a cauſtic, and is much uſed by the farriers with that intention. A little cotton wool moiſtened with it, and put into the hollow of an aching tooth frequently relieves the pain.—Dr. Withering ſays, the country people uſe the tops to dye purple.—Goats and ſheep eat it. Horſes are not fond of it. Cows refuſe it.

ORIGANUM *onites.* *Winter or Pot Marjoram.* Glapwell, Mr. Coke. P. Aug.

Dr. Stokes thinks it extremely doubtful, whether this is an Engliſh plant.

THYMUS *ſerpyllum.* *Mother of Thyme. Wild Thyme.* P. July. Aug.

Matlock; Peak foreſt; Buxton; Littleover; and Radbourn Common.

It generally, if not always grows in a calcareous ſoil. I have obſerved, that in the peak, wherever the limeſtone ceaſes, it diſappears. This is particularly the caſe on the weſt ſide of Peak foreſt, and at Buxton.

The whole plant is in ſome degree fragrant, and yields an eſſential oil, which is very heating, and pungent. Dr. Withering obſerves, that an infuſion of the leaves removes the headach,

ach, occaſioned by the debauch of the preceding evening. A general opinion prevails, that the fleſh of ſheep which feed upon aromatic plants, particularly upon thyme, is much ſuperior in flavour to common mutton; but Mr. Bowles, the ingenious author of the account of the ſheep walks in Spain (*Gent. Mag.* 1764) conſiders this as a vulgar error. He ſays, that ſheep are not fond of aromatic plants, that they will carefully puſh aſide the thyme to get at the graſs, growing beneath it; and that they never touch it, unleſs when walking apace, and then they will catch at any thing. The attachment of bees to this and other aromatic plants is well known.—Sheep and goats eat it. Swine refuſe it.

THYMUS *acinos. Corn Thyme or Wild Baſil.*
Glapwell. Mr. Coke. A. Auguſt.

Horſes eat it. Cows are not fond of it. Sheep and goats refuſe it.

MELISSA *nepeta. Field Calamint.* P. Aug.
S. Normanton.

SCUTELLARIA *galericulata. Common Skull-cap or hooded willow herb.* P. Auguſt.
In moiſt ſituations; Pinxton.

SCUTELLARIA *minor. Leſſer Skull-cap.*
Pinxton. P. July. Aug.

PRUNELLA *vulgaris. Common Self-heal.* P, July. Common in meadows and paſtures.

Order II.

ANGIOSPERMIA. SEEDS COVERED.

RHINANTHUS *criſta galli. Yellow Rattle or Coxcomb.* Frequent in meadows. A. July.

EUPHRASIA *officinalis. Common Eyebright.* A. July.—Sept.

Pinxton; S. Normanton; Matlock; Rough Heanor; and Wirkſworth moor.

It is a weak aſtringent, and was formerly in repute as a remedy for impaired ſight.

Cows, horſes, goats, and ſheep eat it. Swine refuſe it.

EUPHRASIA *odontites. Red Eyebright.*
Derby; Pinxton. A. July.—Sept.

MELAMPYRUM *ſylvaticum. Yellow Cow-graſs or Wheat.* A. Auguſt.

Crich; Matlock. Mr. Coke.

Cows, ſheep, and goats eat it, and with a plentiful ſupply of it ſoon grow fat.

LATHRÆA *ſquamaria. Great Toothwort or Lungwort.* P. April.

Pleaſly park. Mr. Hallows.

It grows only in ſhady places, which the ſun's rays can ſcarcely penetrate, it being almoſt deſtitute of leaves; and ſuch plants alone can live without the light of the ſun. Linn.

Goats, ſheep, and ſwine eat it. Cows and horſes refuſe it.

PEDICULARIS *paluſtris*. *Marſh Louſewort.* Pleaſly; and Mackworth. P. July.

Goats eat it, but it is very diſagreeable to cattle. Swine are not fond of it.

PEDICULARIS *ſylvatica*. *Common Louſewort.* On Quarndon common; Pinxton. P. June.

The expreſſed juice, or a decoction of this plant, has been uſed with advantage as an injection for ſinuous ulcers. If the healthieſt flock of ſheep be fed with it, they become ſcabby and ſcurfy in a ſhort time; the wool gets looſe, and they will be over-run with vermin. Dr. Withering.—Cows and ſwine refuſe it.

ANTIRRHINUM *cymbalaria*. *Ivy-leaved Snapdragon, or Toad-flax.* P. July.—Oct.

Wingerworth; Glapwell; S. Normanton; Pleaſly; Mr. Coke. And on the garden wall at Wingerworth hall.

ANTIRRHINUM *elatine*. *Sharp-pointed Fluellin.* A. July.—Oct.

Pinxton; and Boozwood, near Holbrooke.

This is conſiderably more bitter than the other ſpecies, and is ſaid to have been uſed ſucceſsfully in caſes of foul ulcers and in cutaneous eruptions.

ANTIRRHINUM *linaria.* *Common Toad-flax.* P. July.—Sept.

Pinxton; and Derwent Banks, near Derby.

An infuſion of the leaves is diuretic and purgative. An ointment prepared from them gives relief in the piles. The expreſſed juice, mixed with milk, is a poiſon to flies, as is likewiſe the ſmell of the flowers. Dr. Withering.—Cows and ſwine refuſe it. Sheep, goats, and horſes are not fond of it.

ANTIRRHINUM *majus.* *Greater Toad-flax, or Snapdragon.* Matlock. Mr. Coke. July.

ANTIRRHINUM *minus.* *Leſſer Toad-flax.* Pinxton. Mr. Coke. A. July.

Cows and ſheep eat it. Swine are not fond of it. Horſes and goats refuſe it.

SCROPHULARIA *nodoſa.* *Knobby-rooted Figwort.* Auguſt.

Bolſover caſtle; near the brook at Markeaton.

This plant is ſcarcely known in modern practice; but the rank ſmell, and bitter taſte of the leaves, ſeem to indicate ſome active properties.—Swine, which have the ſcab, are cured by waſhing them with a decoction of the leaves. Waſps reſort greatly to the flowers.

Goats eat it. Cows, horſes, ſheep, and ſwine refuſe it.

SCROPHULARIA *aquatica. Water Betony, Figwort.* Frequent in watery places; at Derby and Pinxton. July.

DIGITALIS *purpurea. Common Foxglove.*
Frequent in dry ſituations. .P July.

A dram of it, taken inwardly, excites violent vomiting. It has been found very uſeful in dropſical caſes. Thoſe, who wiſh to be more fully acquainted with its nature and efficacy, may be gratified by conſulting Withering on the Foxglove. *Med. Tranſ.* iii. *and Lond. Medic. Journal.*

OROBANCHE *major. Common Broom-rape.* Between Holbrooke & Alfreton. Dr. Johnſon.

Claſs XV.

TETRADYNAMIA *SILICULOSA.*

IV. CHIVES LONGER. *SEED-VESSEL a POUCH·*

MYAGRUM *ſativum. Gold of Pleaſure.*
Normanton. Mr. Coke. A. June.

It is cultivated in Germany for the ſake of the expreſſed oil of the ſeeds, which the inhabitants uſe for medicinal, culinary, and œconomical purpoſes.—The ſeeds are a favourite food with geeſe.—Horſes, cows, goats, and ſheep eat it.

DRABA *muralis.* *Common Whitlow-graſs.*
Pinxton; Normanton; Derby. April.

One of our earlieſt flowering plants. It is good as a ſallad.—Goats, ſheep, and horſes eat it. Cows are not fond of it. Swine refuſe it.

DRABA *muralis.* *Speedwell-leaved Whitlow-graſs.* A. May.

Fiſſures of rocks, mountainous and ſtony paſtures, eſpecially in a calcareous ſoil in Derbyſhire. Dr. Withering.

THALASPI *burſa paſtoris.* *Shepherds Purſe.*
Frequent. Derby. A. March.—Sept.

COCHLEARIA *officinalis.* *Garden Scurvy-graſs.* Near the caſtle at Caſtleton. Mr. Coke. J. Martin, Dr. Stokes, and Dr. Leigh.

It poſſeſſes a conſiderable degree of acrimony, and this acrimony ſeems to reſide in a very ſubtile eſſential oil. Its effects as an anti-ſcorbutic are univerſally known; and it is a powerful remedy in the pituitous aſthma, and in what

Sydenham calls the ſcorbutic rheumatiſm. A diſtilled water, and a conſerve, are prepared from the leaves, and its juice is preſcribed along with that of oranges, by the name of anti-ſcorbutic juices. It may be eaten as a ſallad.——Cows eat it. Horſes, goats, and ſheep refuſe it.

Order II.

SILIQUOSA. SEED-VESSEL a POD.

ERYSIMUM *officinale. Hedge Muſtard. Bank Creſſes. Scrambling Rocket.* A. May.

Frequent. S. Normanton; Derby.

It is warm and acrid to the taſte, and when cultivated is uſed as a ſpring pot-herb. Birds are fond of the ſeed.—Goats and ſheep eat it. Cows, horſes, and ſwine refuſe it.

By means of this herb a hoarſeneſs, occaſioned by loud ſpeaking, was cured in three days, by Rondeletius. Linn.——"Juice of "hedge muſtard is beyond any thing in ulcers "of the throats. This was found by experi-"ence by the hon. Harry Gray, eſq; when all "advice of doctors and ſurgeons availed no-"thing. This from his own mouth." Manuſcript note in a copy of Parkinſon, which formerly belonged to Mr. Saunders, ſurgeon, at Stourbridge.

ERYSIMUM *barbarea.* *Winter Creſſes. Winter Rocket.* P. May.

Alfreton, Normanton, Duffield, and Holmes near Derby.—The leaves are eaten in ſallads.—Cows eat it. Horſes and ſwine refuſe it. Goats and ſheep are not fond of it.

ERYSIMUM *alliaria.* *Stinking Hedge Muſtard. Jack-in-the-hedge. Sauce-alone.*

Common in hedges. P. May.—July.

When it grows in poultry yards, the fowls eat it, and it gives an intolerable rank taſte to the fleſh. Dr. Withering.—Cows and goats eat it. Horſes, ſheep, and ſwine refuſe it.

ERYSIMUM *cheiranthoides.* *Treacle Worm-ſeed.* Derby. Aſhbourn. A. July.

The country people give the ſeeds to deſtroy worms, and with good effect.—Horſes, cows, ſheep, goats, and ſwine eat it.

CHEIRANTHUS *cheiri.* *Wall-ſtock or flower.* Codnor caſtle. Wingfield manor. Old walls, Derby. P. May. June.

TURRITIS *glabra.* *Tower Muſtard.* Between Aſhbourn and Okeover. Dr. Stokes.

BRASSICA *rapa.* *Turneps.* B. May.

Corn fields.—They relax the bowels, and are ſuppoſed to ſweeten the blood. They are hurtful to pregnant or hyſterical women, and to thoſe who are ſubject to flatulencies. The juice, well fermented, affords, by diſtillation, an ardent ſpirit. The rind is acrimonious. The moſt important uſe of turneps is for cattle during the winter ſeaſon.

BRASSICA *napus*. *Wild Navew. Rape. Nape.* B. May. June.

Frequent in corn fields and ditch banks.

The roots of the cultivated variety may be eaten like the turnep, but they have a ſtronger taſte, and its ſeeds, which are called Cole-ſeed, afford a large quantity of expreſſed oil, called rape oil. What remains after the expreſſing of the oil is called oil cake, and is uſed for fattening oxen. In Norfolk the cakes are broken to pieces and ſtrewed on the land as a manure. It is thought to be a very efficacious one, and is ſold from 4l. to 6l. per ton. About half a ton is laid on an acre. Mr. Woodward.——Cows, goats, and ſwine eat it.

CARDAMINE *petræa*. *Mountain Ladies-ſmock.* Middleton dale. Mr. Coke. P. June.

CARDAMINE *pratenſis*. *Common Ladies-ſmock, or Cuckow Flower.* P. Apr. May.

Frequent in meadows and moiſt paſtures.

The virtue of the flowers in hyſteric and epileptic caſes was firſt mentioned by Ray, in his letters, publiſhed by himſelf; and ſince then by Dr. Baker in the *Medical Tranſ. v.* i. *p.* 442. The doſe is from 20 to 90 grains twice a day. Dr. Withering ſays, do they not act like the treacle worm-ſeed in the epilepſies of children, and cure the diſeaſe by deſtroying the worms in the ſtomach and inteſtines, which were the cauſe of the fits? I have accounts of their ſucceſs in young epileptics, from good authority; but have never been fortunate enough to ſee them of much uſe in hyſterical caſes.—Goats and ſheep eat it. Horſes and ſwine refuſe it. Cows are not fond of it.

CARDAMINE *impatiens. Impatient Ladies-ſmock.* Matlock. Mr. Coke. Pilkington.—Poole's hole near Buxton. Mr. J. Martin. June.

CARDAMINE *parviflora. Small flowered Ladies-ſmock.* A. April.
South Normanton. Mr. Coke.

CARDAMINE *hirſuta. Hairy Ladies-ſmock.*
S. Normanton. Glapwell. Mr. Coke. June.
It is pretty warm in the mouth, much reſembling water creſs in taſte. Dr. Stokes.

CARDAMINE *amara. Bitter Creſſes.*
Siddals near Derby. Rough Heanor. June.
Sheep eat it. Cows are not fond of it.

RAPHANUS *rhaphaniſtrum.* *Corn Radiſh, or Charlock.* Pinxton. Derby. A. June.

Horſes eat it. Cows refuſe it.

SISYMBRIUM *naſturtium.* *Common Water-creſſes.* June.

Frequent near ſprings and brooks.

This is univerſally uſed as an early and wholeſome ſpring ſallad. It is an excellent anti-ſcorbutic and ſtomachic, with leſs acrimony than the ſcurvy-graſs. It is an ingredient in the anti-ſcorbutic juices.

SISYMBRIUM *ſophia.* *Flix-weed.* A. July.

Markeaton hill, on the road to Aſhbourn, near Derby.

SISYMBRIUM *irio.* *Broad-leaved Water-creſs, or Hedged Muſtard.*

Wingfield manor. A. June.

SINAPIS *nigra.* *Common Muſtard.* A. June.

Ditch banks and road ſides. Pinxton.

The ſeeds, taken inwardly, in the quantity of a meat ſpoonful or more, gently looſen the bowels, and are of ſervice in the aſthma, chronic rheumatiſm, and palſy. Cataplaſms, formed with crumb of bread, vinegar, and powdered muſtard ſeed, are very commonly applied to the ſoles of the feet, as ſtimulants, in fevers, which require ſuch treatment; they are uſed with advantage, topically applied, in fixed rheumatiſm and ſciatic pains. Upon the whole, whenever we want a ſtrong ſtimulus, which acts upon the nervous ſyſtem, without exciting much heat, we know none preferable to muſtard ſeed. Its acrimony conſiſts in an eſſential oil.

SINAPIS *arvenſis.* *Charlock.* *Corn Cale.* Corn fields. A. June.

The young and tender tops are ſometimes boiled and eaten as cabbage in Derbyſhire.

Cows, goats, and ſwine eat it. Sheep are very fond of it. Horſes generally refuſe it.

Claſs XVI.

MONADELPHIA *DECANDRIA.*

THREADS UNITED. *X. CHIVES.*

GERANIUM *cicutarium.* *Hemlock Cranes-bill.* P. June.—Sept.
Middleton dale. Nuns green, Derby.

GERANIUM *moſchatum.* *Muſked Cranes-bill.* Alfreton. Mr. Coke. June.

GERANIUM *pratenſe.* *Crowfoot Cranes-bill.* Frequent in meadows. P. June. July.
Horſes, cows, ſheep, goats, and ſwine eat it.

GERANIUM *molle.* *Doves-foot.*

Frequent in dry ſituations. A. Apr.—Oct.

GERANIUM *robertianum.* *Stinking Cranes-bill.* *Herb Robert.* B. Apr.—Aug.

Frequent on walls, and in hedges.

A decoction of this plant has been known to give relief in calculous caſes. It is conſiderably aſtringent, and is given to cattle when they make bloody water, or have the bloody flux.

Horſes and goats eat it. Sheep and ſwine refuſe it,

GERANIUM *lucidum.* *Shining Cranes-bill.*

Dethick. Pleaſly park. Mr. Coke. Near Peak's hole. Mr. J. Martin. June.

GERANIUM *columbinum.* *Long-ſtalked Cranes-bill.* A. June.—Aug.

Middleton dale. Mr. Coke. Dovedale.

Sheep and goats eat it. Swine refuſe it.

GERANIUM *diſſectum.* *Jagged Cranes-bill.*

Ditch banks. Pinxton. Derby. A. May.

GERANIUM *rotundifolium.* *Round-leaved Cranes-bill.* Derby. A. July.

Horſes and ſheep eat it. Cows and ſwine refuſe it.

GERANIUM *ſanguineum.* *Bloody Cranes-bill.* Near Buxton. Mr. Woodward. P. July.

Order VI.

POLYANDRIA. MANY CHIVES.

MALVA *ſylveſtris.* *Common Mallow. Mauls.* June. July.

Frequent in hedges, and amongſt rubbiſh.

In France paper is manufactured from this plant. It is ſaid to be beſt adapted to making that which is uſed for hanging rooms.

MALVA *rotundifolia.* *Round-leaved Mallow.* Derby. Normanton. A. June.—Oct.

Sheep eat it. Goats, horſes, and ſwine refuſe it. Cows are not fond of it.

MALVA *parviflora.* *Small-flowered, or dwarf Mallow.* Pinxton. Derby. July.

MALVA *moſchata.* *Muſk Mallow.* B. July.

Duffield. Alleſtry. Derby. Pilkington.

I do not know, whether I ought to inſert Malva alcæa, Vervain mallow, as a native plant of Derbyſhire. I find it in three different catalogues of plants with which I have been favoured. From them it appears to grow at South Normanton, between Holbrooke and Alfreton, and near Derby; and I ſhould not have heſitated to put it down as an Engliſh plant, had not ſo much been ſaid againſt this opinion in the botanical Arrangement of Britiſh plants by Dr. Withering, *p.* 740. *note.*

Claſs XVII.

The ſeeds of this claſs furniſh food for men, and other animals: they are farinaceous and flatulent. The leaves are food for cattle. None of them are poiſonous.

Dr. Pultney, in a note added to his tranſlation of the Pan Suecicus, ſays, "A general "view of this claſs ſhews at once how very "acceptable its plants are to almoſt all cattle. "Cows and ſheep refuſed none, and horſes "not more than three, out of the whole "number with which they were tried."

DIADELPHIA *HEXANDRIA.*

THREADS in 2 SETS. *VI. CHIVES.*

Order II.

FUMARIA *officinalis.* *Common Fumitory.*

Not uncommon in corn fields and gardens.

Cows and ſheep eat it. Goats are not fond of it. Horſes refuſe it.

The leaves are ſucculent, ſaline, and bitter. The expreſſed juice, in doſes of two or three ounces, is uſeful in hypochondriacal and ſcorbutic diſorders. It corrects acidity, and ſtrengthens the tone of the ſtomach. Hoffman prefers it to all other medicines as a ſweetener of the blood. Its utility in obſtructions of the viſcera and the diſeaſes ariſing from hence will ſcarcely admit of a doubt.—An infuſion of the leaves is uſed as a coſmetic to remove freckles and clear the ſkin. Mr. Woodward.

FUMARIA *claviculata*. *Climbing Fumitory.*
Dethick. Mr. Coke. A. June.

Order III.

OCTANDRIA. VIII. CHIVES.

POLYGALA *vulgaris*. *Common Milkwort.*
Pinxton. Kedleſton. Buxton. P. June.

Linnæus found it to poſſeſs the properties of the Senega rattle-ſnake root, but in an inferior degree. Duhamel uſed it in pleuretic caſes with the deſired ſucceſs. *Mem. de Paris,* 1740.—The powdered root may be given in doſes of half a dram.—Cows, goats, and ſheep eat it. Swine refuſe it.

Order IV.

DECANDRIA. X. CHIVES.

SPARTIUM *ſcoparium*. *Broom.* S. June.
Pinxton, Makeney, and Horſley caſtle.

A decoction of the green tops, or an infuſion of the ſeeds, has been uſed with ſucceſs in dropſical complaints.—The plant, when in full bloſſom, has a beautiful appearance.

GENISTA *tinctoria*. *Dyers-weed. Green-weed.* S. June.

Baſlow. Coxbench wood. Rough Heanor.

A yellow colour may be obtained from the flowers; but its principal excellence is that of dying wool green. A dram and half of the powdered ſeeds operates as a mild purgative. A decoction of the plant has been uſed with advantage in the dropſy.—Horſes, cows, goats, and ſheep eat it.

GENISTA *anglica*. *Needle Furze. Petty Whin.* Pinxton. S. June.

ULEX *europæus*. *Gorze. Furze. Whins.* Common.—It bloſſoms throughout the year. Goats, cows, ſheep, horſes, and aſſes eat it.

ONONIS *ſpinoſa*. *Common Reſt-harrow.*

Baſlow. Pleaſly. Derby.—A decoction of the roots is bitteriſh and diuretic, and has been recommended in caſes of ſtone and jaundice. The cortical part of the root, reduced to powder, has been given in doſes of a dram with the ſame intention.—Cows and goats eat it. Sheep are very fond of it. Horſes and ſwine refuſe it.

ONONIS *arvenſis.* *Hairy Reſt-harrow.* Pleaſly. Mr. Coke.

ANTHYLLIS *vulneraria.* *Ladies-finger. Kidney Vetch.* S. Normanton. P. July.

It makes an excellent paſturage for ſheep. —But the ſeparate cultivation of it will not ſucceed, excepting in chalky grounds. Dr. Pultney.

LATHYRUS *aphaca.* *Yellow Vetchling.* Pinxton; Derby; A. June.—Sept.

The ſeed of this and all the other ſpecies is nutritious, either eaten in broth or made into bread.

LATHYRUS *niſſolia.* *Crimſon Graſs Vetch.* Carnfield, near Alfreton; Dr. Johnſon. Betwixt Breaſon and Riſley. A. June.

It is ſometimes introduced into gardens.

LATHYRUS *hirſutus.* *Rough podded Vetchling, or Peaſe-everlaſting.* A. July. S. Normanton. Mr. Coke.

LATHYRUS *paluſtris.* *March Vetching.* Pinxton. Mr. Coke. P. July.

LATHYRUS *pratenſis.* *Common Yellow Vetchling.* Derby. P. July.

VICIA *cracca.* *Tufted Vetch.* P. Aug.

VICIA *ſativa.* *Common Vetch.* A. April.

Common in meadows and paſtures.

In Glouceſterſhire and Worceſterſhire they ſow it as paſturage for horſes, and eat it off early enough to allow of Turneps being ſown the ſame year. The ſeeds are excellent food for pigeons.

VICIA *lutea.* *Yellow Vetch.*

Pinxton, and Derby.

VICIA *ſepium.* *Buſh Vetch.* P. May. June.

Mackworth.

This plant is not only a perennial, but an evergreen; it ſhoots up early in the ſpring, vegetates late in autumn, and continues green throughout the winter, though the weather be ſevere. Add to this, that cattle are remarkably fond of it. Theſe peculiarities, it ſhould ſeem, would make it particularly valuable to the farmer as a green food for his ſheep in the winter and ſpring, when food of that denomination is exceedingly ſcarce. Perhaps one chief reaſon why it has not come into general cultivation is, the difficulty of collecting good ſeed. The pods do not ripen all together, and burſt with great elaſticity. When the ſeed is procured, ſcarcely one third of them will vegetate. This is owing to an internal defect, which is occaſioned by certain inſects making them the neſt and food of their young. However on account of the uncommon produce of the good ſeed, it ſeems to be highly worthy of attention. Mr. Swaine, who has made the foregoing obſervations, had three crops from this plant in the courſe of one year. He calculates, that an acre ſown with the buſh vetch would yield 24 tons, 11 cwt. 3 qrs. 3 lb. of green fodder, or 4 tons, 9 cwt. 3 qrs. 15 lb. of dry fodder.—*(Bath papers, vol.* iii. *page* 71.*)*

ERVUM *hirſutum*. *Wild Tare.*

Pinxton; Langley field.

In wet ſeaſons whole fields of corn have been over-powered and wholly deſtroyed by it.

ORNITHOPUS *perpuſillus*. *Bird's Foot.*

Dethick; Mr. Coke. Quarndon common.

TRIFOLIUM *repens*. *Dutch Clover.*

This plant indicates a good ſoil; and with other graſſes makes excellent paſturage.

TRIFOLIUM *pratenſe*. *Purple Trefoil or Clover.* B. May.—Sept.

Meadows and paſtures.—The cultivation of it forms an important part of good huſbandry.

TRIFOLIUM *agrarium*. *Hop Trefoil.*

Paſtures. A. June.—July.

TRIFOLIUM *procumbens*. *Procumbent Trefoil.* A. May.

Meadows and paſtures, Crich.

Trifolium *filiforme.* *Small Trefoil.*
Crich; Bolſover Caſtle. A. May.—Aug.

Trifolium *arvenſe.* *Hares-foot Trefoil.*
Langley. A. July.—Aug.

The flowers of all the ſpecies, dried and powdered, may be made into bread, which in times of ſcarcity, has preſerved the inhabitants of Scotland from periſhing. The leaves of all the ſpecies fold up before rain.

Lotus *corniculatus.* *Common Bird's-foot Trefoil.* Derby; Pinxton. P. June.—Aug.

Claſs XVIII.

POLYADELPHIA *POLYANDRIA.*

THREAD in MANY SETS. *MANY CHIVES.*

Hypericum *perforatum.* *Common St. John's Wort.* P. July.

Frequent in woods and hedges.

This plant has been recommended in hyſterical and hypocondriacal diſorders. The leaves given in ſubſtance are ſaid to deſtroy worms.

Cows, goats, and ſheep eat it. Horſes and ſwine refuſe it.

HYPERICUM *humifuſum.* *Trailing St. John's Wort.* P. July.

———— *pulchrum.* *Upright St. John's Wort.*

Both ſpecies found at Pinxton, and Gorſey-cloſe near Coxbench; the latter alſo at Alleſtry.

HYPERICUM *quadrangulare.* *Quadrangular St. John's Wort, or St. Peter's Wort.*

Derby; Markeaton.

HYPERICUM *hirſutum.* *Hairy St. John's Wort.* Mackworth. P. July.

Claſs XIX.

SYNGENESIA. *POLYGAMIA ÆQUALIS.*

TIPS UNITED. *CHIVES and POINTALS EQUAL.*

TRAGOPOGON *pratenſe.* *Yellow Goats-beard. Go to bed at noon.* B. June.

Pinxton; Derby.—The young ſhoots in the ſpring, boiled like aſpargus, have the ſame flavour, and are nearly as nutritious.—Cows, ſheep, and horſes eat it. Swine devour it greedily. Goats are not fond of it.

SONCHUS *arvenſis.* *Corn Sowthiſtle.* Aug.

SONCHUS *oleraceous.* *Common Sowthiſtle.* July

LACTUCA *ſcariola*. *Prickly or mild-ſcented Lettuce*. About the entrance into Peak's hole. Mr. J. Martin. B. Aug.

LACTUCA *viroſa*. *Strong-ſcented Lettuce*. Matlock. Mr. Coke. B. July. Aug.

The juice, which is milky, acrid, and bitter, has the ſcent, and partakes of the properties of opium. Dr. Collin relates 24 caſes of dropſy, out of which 23 were cured by taking the extract prepared from the expreſſed juice, in doſes from 18 grains to 3 drams in 24 hours. It commonly proves laxative, promotes urine, and gentle ſweats, and removes the thirſt. It muſt be prepared when the plant is in flower.

LEONTODON *taraxacum*. *Dandelion*. *Piſs-a-bed*. P. April.—Sept.

It is ſometimes eaten in ſallads. It is diuretic, and on account of this property, has acquired one of the names by which it is vulgarly diſtinguiſhed.—When a ſwarm of locuſts had deſtroyed the harveſt in the iſland of Minorca, many of the inhabitants ſubſiſted upon this plant. In the late ſiege of Gibraltar, (*Drinkwater's hiſtory of it, page* 81.) dandelion, thiſtles, and wild leeks, &c. were for ſome time the daily nouriſhment of numbers.—The expreſſed juice has been given, to the quantity of 4 ounces, 3 or 4 times a day; and Boerhaave had a great opinion of this and other lacteſcent plants in viſceral obſtructions.—Goats eat it. Swine devour it greedily. Sheep and cows are not fond of it. Horſes refuſe it. Small birds are fond of the ſeeds.

LEONTODON *hiſpidum.* *Rough Hedypnois.* Meadows and paſtures. P. June.

HIERACIUM *piloſella.* *Creeping Mouſe-Ear or Mouſe-eared Hawkweed.* P. May. Sept. S. Normanton; Derby; Mackworth.

Goats eat it. Sheep are not fond of it. Horſes and cows refuſe it.

HIERACIUM *dubium.* *Creeping Hawkweed.* Coxbench wood. Dr. Johnſon. P. July.

Sheep eat it.

HIERACIUM *murorum.* *Wall Hawkweed. Golden Lungwort.* Pinxton. Derby. P. July.

HIERACIUM *ſabaudum.* *Shrubby Hawkweed.* Brampton. P. July. Aug.

Horſes, cows, goats, ſheep, and ſwine eat it.

CREPIS *tectorum.* *Yellow hedypnois, or Devil's-bit.* Pinxton. A. June.—Sept.

Cows, goats, ſheep, and ſwine eat it. Horſes are not fond of it.

LAPSANA *communis.* *Common Nipplewort.* Pinxton. June.

CICHORIUM *intybus.* *Wild Succory, or Cichory.* Clown. B. July. Aug.

The leaves, when blanched, are eaten early in the ſpring in ſallads. They loſe their bitterneſs by cultivation.—Sheep, goats, and ſwine eat it. Cows and horſes refuſe it.

ARCTIUM *lappa.* *Burdock. Clott-bur.* Frequent. B. July.

A decoction of the roots is eſteemed by ſome very ſenſible phyſicians, as equal, if not ſuperior to that of ſarſaparilla.—Cows and goats eat it. Sheep and horſes refuſe it. Swine are not fond of it.

SERRATULA *tinctoria.* *Common Saw-wort.* Woods and paſtures. P. July.

This is very much uſed by the dyers to give a yellow, but is inferior to the Yellow-weed. Its uſe, therefore, is confined to the coarſer woollen cloths.—Goats eat it. Horſes are not fond of it. Sheep, ſwine, and cows refuſe it.

CARDUUS *lanceolatus.* *Spear Thiſtle.* On rubbiſh and road ſides. B. Auguſt.

The flowers, like thoſe of the artichoke, have the property of curdling milk.—Sheep and ſwine refuſe it; neither horſes, cows, or goats are fond of it.

CARDUUS *nutans.* *Muſk Thiſtle.* P. July.
CARDUUS *criſpus.* *Curled Thiſtle.* A. July.
CARDUUS *paluſtris.* *Marſh Thiſtle.* P. Aug.
Not unfrequent.—Swine eat the laſt. Horſes are very fond of it. Cows refuſe it.

CARLINA *vulgaris.* *Wild Carline Thiſtle.* Middleton dale.—Goats eat it. Cows refuſe it.

BIDENS *tripartita.* *Water Hemp. Hemp Agrimony.* Not uncommon. A. July.
It dyes a tolerably good yellow.—Cows and ſheep eat it. Horſes, ſwine, and goats refuſe it.

BIDENS *cernua.* *Nodding Double-tooth.* Pinxton. Brook at Little Eaton.—Goats eat it. Horſes refuſe it.

EUPATORIUM *cannabinum.* *Hemp Agrimony.* Matlock. Duffield. P. July.
Goats eat it; but other animals refuſe it.

Order II.

POLYGAMIA SUPERFLUA.

SUPERFLUOUS POINTALS.

TANACETUM *vulgare.* *Common Tanſy.* Pinxton; Horſley caſtle; Mackworth; on the banks of the Derwent, and the neighbouring meadows for many miles above and below Derby. P. July.

This is a warm deobſtruent bitter. The juice of the tender leaves are ſometimes uſed to give a flavour to puddings. If a dead animal ſubſtance is rubbed with this plant, the fleſh fly will not attack it. The Finlanders obtain a green dye from it.——Cows and ſheep eat it. Horſes, goats, and ſwine refuſe it.

ARTEMISIA *abſinthium.* *Wormwood.*

Dethick, Mackworth, Mickleover, Alvaſton, and Horſley caſtle. P. Aug.

The leaves and flowers are very bitter; the roots are warm and aromatic. A conſiderable quantity of eſſential oil riſes from it in diſtillation. This oil is uſed both externally and internally to deſtroy worms.—The leaves, put into ſour beer ſoon deſtroy the aceſcency.—They reſiſt putrefaction, and are therefore a principal ingredient in antiſeptic fomentations. An infuſion of them is a good ſtomachic, and with the addition of fixed alkaline ſalt, a powerful diuretic in ſome dropſical caſes.—In the *Amœn. Acad. vol.* ii. *p.* 160, Linnæus mentions two caſes, wherein an eſſence prepared from this plant, and taken for a conſiderable time, prevented the formation of ſtones in the kidneys or bladder; the patients forbearing the uſe of wine and acids. It will, like all other bitters, weaken the action of the nervous ſyſtem, but in theſe inſtances no ſuch effect took place. Dr. Withering.—Horſes and goats are not fond of it. Cows and ſwine refuſe it. Turkeys are fond of it.—The plant ſteeped in boiling water, and repeatedly applied to a bruiſe, will remove the pain in a ſhort time, and prevent the ſwelling and diſcoloration of the part. Dr. Stokes.

ARTEMISIA *vulgaris. Mugwort.* P. Aug.

Not uncommon on road ſides.—The Chineſe make uſe of it in healing wounds, applying the freſh plant bruiſed. *Oſbeck* i. *p.* 394.—A decoction of it is taken by the common people to cure the ague.—A dram of the leaves powdered was given, four times a day, by Dr. Home, to a woman who had been affected with hyſteric fits for many years. The fits ceaſed in a few days. In this patient aſſafœtida and æther had been given to no purpoſe.

Sheep and ſwine refuſe it. Neither horſes, cows, or goats are fond of it.

GNAPHALIUM *germanicum. Common Cudweed. Chafeweed.* July.

Roads about Coxbench. Betwixt Derby and Oſmaſton.—It is given to cattle, which have the bloody flux, and has been tried with ſucceſs in ſimilar complaints of the human body.

GNAPHALIUM *uliginoſum*. *Black-headed Cudweed*. Derby. Alleſtry. A July.

Cows and goats refuſe it.

GNAPHALIUM *gallicum*. *Graſs-leaved Cudweed*. Heaths. Mr. Woodward.

TUSSILAGO *farfara*. *Common Colt's-foot*.
Frequent. P. March. April.

The leaves are the principal ingredient in the Britiſh herb tobacco. They were formerly much uſed in coughs and conſumptive complaints; and perhaps not without reaſon, for Dr. Cullen has found them to do conſiderable ſervice in ſcrophulous caſes; he gives a decoction of the dried leaves, and finds it ſucceed where ſea-water has failed. *Cullen's Mat. Med. p.* 458.—And Fuller relates a caſe of a girl, with twelve ſcrophulous ſores, who was cured by drinking daily as much as ſhe could, for above four months, of a decoction of the leaves, made ſo ſtrong, as to be ſweetiſh and glutinous. *Med. Gymn. p.* 91.—Goats and ſheep eat it. Cows are fond of it. Horſes and ſwine refuſe it.

TUSSILAGO *petaſites*. *Butterbur*. *Peſtilent-wort*. P. March. April.

Upon the banks of the Derwent at Matlock, Duffield, and Derby.—Its leaves are the largeſt of any of our native plants. Horſes, cows, goats, and ſheep eat it.—The roots abound with a reſinous matter. They have a ſtrong ſmell and a bitteriſh acrid taſte.

SENECIO *vulgaris*. *Groundſel*. *Simſon*. Frequent. A. April.—Sept.

A ſtrong infuſion of the plant vomits.—The bruiſed leaves are a good application to boils.—Cows are not fond of it. Goats and ſwine eat it. Horſes and ſheep refuſe it.

SENECIO *jacobæa*. *Ragwort*. *St. James's Wort*. Pinxton; Alleſtry; Derby. P. July.

If woollen cloth is boiled in alum-water, and then in a decoction of the flowers, it takes a beautiful deep yellow.

SENECIO *erucifolius*. *Hoary Groundſel*. Hedges at Derby; Alleſtry. P. July. Aug.

SENECIO *aquaticus*. *Water Groundſel, or Ragwort*. Derby; Pinxton; P. Aug.

SOLIDAGO *virgaurea*. *Golden rod*. P. Aug. Dethick; Dale Abbey.

This plant is diuretic, and in the north of England is much eſteemed for giving relief to thoſe, who are afflicted with the ſtone or gravel. An inſtance of its powerful efficacy in theſe complaints is mentioned in the *gentleman's magazine, Feb.* 1788, *page* 103. A boy at Shotton, in the county of Durham, for two or three years had been frequently troubled with a ſuppreſſion of urine, accompanied with ſymptoms of the gravel and ſtone. For ſome months he took, occaſionally, the decoction or the tea of golden rod. At length he began to diſcharge a great quantity of gravel, with many ſtones along with it. For ſome time the ſtones encreaſed in ſize and quantity. He parted with more than 60, ſome of which weighed 1¼ ounce. To the medicine above mentioned is generally attributed this extraordinary conſequence. We cannot therefore wonder, that golden rod ſhould be a plant, very much valued and cultivated in the north, when it is capable of producing ſo important and ſalutary an effect.

Horſes, cows, ſheep, goats and ſwine eat it.

INULA *dyſenterica. Middle Elecampane, or Flea-bane.* Derby; Pinxton. P. July. Aug.

The Ruſſian ſoldiers in the Perſian expedition under General Keit, were much troubled with the bloody flux, which was cured by the uſe of this plant.—Cows are not fond of it. Goats and ſheep refuſe it.

BELLIS *perennis. Common Daiſy.* P. May.

Not uncommon in meadows and paſtures.—Horſes, ſheep, and cows refuſe it. Linn.

CHRYSANTHEMUM *leucanthemum. Ox-eye, or greater Daiſy.* May.

Derby; Little Eaton; Middleton dale.

Horſes, ſheep, and goats eat it. Cows and ſwine refuſe it.

CHRYSANTHEMUM *ſegetum. Yellow Ox-eye. Corn Marigold.* A. June.—Oct.

S. Normanton. Alleſtry.

Cut, when it is in flower, and dried, it is eaten by horſes.

CHRYSANTHEMUM *inodorum. Chamomile Goldins.* Road ſides, Derby. A. July.

MATRICARIA *parthenium. Common Feverfew.* P. June.

Middleton dale; Mackworth; Derby.—The whole plant has a ſtrong ſmell, and a bitter taſte; and yields an eſſential oil by diſtillation.

MATRICARIA *chamomilla. Corn Feverfew.* Brampton. A. May.—Aug.

Its properties reſemble thoſe of the ſweet-ſcented camomile. The Finlanders uſe an infuſion of it in conſumptive caſes.——Cows, goats, and ſheep eat it. Horſes are not fond of it. Swine refuſe it.

MATRICARIA *ſauveolens. Sweet-ſcented Feverſew.* Pinxton. A. June.—Aug.

Goats, ſheep, and horſes eat it. Swine refuſe it.

ANTHEMIS *arvenſis*. *Corn Chamomile.* June.

In high roads not uncommon. Dr. Johnſon.

ANTHEMIS *cotula*. *Stinking Chamomile, or May-weed.* A. May.—Aug.

Derby. Pinxton. Holbrooke field.

Toads are ſaid to be fond of this plant. It is very ungrateful and diſpleaſing to bees. Goats and ſheep are not fond of it. Horſes, cows, and ſwine refuſe it.—It frequently bliſters the ſkin of reapers, and of children, who happen to gather it. The heads rubbed between the fingers, ſmell intolerably diſagreeable.

ACHILLEA *ptarmica*. *Sneezewort. Gooſe-tongue. Baſtard Pellitory.* P. July. Aug.

In a moiſt cloſe by Radbourn Common. Between Duffield and Coxbench.

ACHILLEA *millefolium*. *Yarrow. Milfoil.*

Frequent. A. June.—Aug.

Sheep and ſwine eat it. Horſes, cows, and goats are not fond of it.

Order III.

POLYGAMIA FRUSTANEA; BARREN FLORETS.

CENTAUREA *nigra*. *Knapweed. Hard-irons.* P. July.

Common in meadows and paſtures.

CENTAUREA *cyanus. Blue-bottles. Batchelor's Button.* A. July.

Corn fields. Oſmaſton. Breadſall. Spondon.

Mr. Boyle ſays, the juice of the central florets, with the addition of a very ſmall quantity of alum, makes a laſting tranſparent blue not inferior to ultramarine. *Gent. Mag.* 1748.

Cows, goats, and ſheep eat it. Horſes and ſwine refuſe it.

CENTAUREA *ſcabioſa. Greater Knapweed.* Pleaſly. P. July.

Horſes, ſheep, goats, and ſwine eat it. Cows refuſe it.

CENTAUREA *jacea. Black Centaury, or Knapweed.* Pinxton. Mr. Coke.

Order VI.

MONOGAMIA; FLOWERS SIMPLE.

JASIONE *montana. Mountain, or Sheep's Scabious.* Pleaſly. Wingerworth. Derby.

VIOLA *odorata. Sweet-ſcented Violet.*

Frequent in hedges. P. March. April.

A ſyrup, obtained from the flowers, has been much employed by chemiſts to detect acids and alkalis, the former changing it to a red colour, and the latter to a green. Profeſſor Bergman has expreſſed his doubts concerning the accuracy of this teſt. But M. Morveau and other chemiſts think them not ſufficiently well founded.

VIOLA *canina. Dog's Violet*. P. Apr.—June.

Cows, ſheep, goats, and ſwine eat it. Horſes refuſe it.—30 or 40 grains of the root in powder act as an emetic.—Both of theſe ſpecies have ſometimes white bloſſoms.

VIOLA *tricolor. Panſies. Three faces under a hood.* A. May.—Sept.

Not uncommon in the Peak.—Dr. Strack ſays, that it infallibly cures the ſcabby complaints in young children, called cruſta lactea. He boils a handful of the freſh, or half a dram of the dried leaves in half a pint of milk, and gives this milk morning and evening for ſome weeks. *Med. Journ. v.* ii. *p.* 188.

VIOLA *lutea. Yellow Panſies*. P. Apr.—Sept.

Lea; Wirkſworth; Dovedale; Chapel le frith; Tideſwell moor; Chatſworth.

Claſs XX.

GYNANDRIA *DIANDRIA.*

CHIVES on the POINTALS. *II. CHIVES.*

ORCHIS *maſcula. Male Fool-ſtones.* May.

Not uncommon. Crich; Rough Heanor;

Horſley.—Mr. Moult, in a letter to Dr. Percival, inſerted in the *Phil. Tranſ. vol.* 59. *p.* 1. deſcribes his method of making ſalep from this plant. The beſt time for gathering the roots, he obſerves, is when the ſeed is formed, and the ſtalk going to fall; for then the new bulb, of which ſalep is made, is arrived at its full ſize. The new roots being ſeparated from the ſtalk, are to be waſhed in water, and the outer thin ſkin taken off. They are then to be ſet in a tin plate in an oven heated to the degree of a bread oven. In 6, 8, or 10 minutes, they will have acquired a tranſparency like horn, without being diminiſhed in ſize. They are then to be removed into another room to dry and harden, which will be done in a few days; or they may be finiſhed in a very ſlow heat in a few hours.—Salep thus prepared, may be ſold for leſs than a ſhilling a pound, and affords a mild nutriment, which, in times of ſcarcity, in caſes of dyſentery and ſtrangury, and on ſhip-board, may be extremely uſeful. *See Percival's eſſays, part* ii. *p.* 37.—Mr. Moult made his experiments upon the roots of this ſpecies only. The following ſpecies is doubtleſs equally proper for the purpoſe, and it is highly probable that every ſpecies of orchis may be uſed indiſcriminately.

Salep has been hitherto imported from Turkey at a conſiderable price; let us hope we ſhall not be ſupplied from foreign markets with an article, which our own country furniſhes in almoſt any quantity. If ever plantations of it are made, the plants muſt be propagated by roots; for the ſeeds ſeldom come to perfection. Dr. Percival ſays, that he got ſome ſeeds to all appearance perfect, but yet they would not vegetate.

ORCHIS *morio*. *Female or Meadow Orchis.*

Meadows and paſtures, Crich. P. May.

ORCHIS *pyramidalis*. *Pyramidal, or late-flowering Orchis.* P. June.—July.

Newton wood. Mr. Coke.

ORCHIS *uſtulata*. *Dwarf Orchis.*

Alfreton; S. Normanton. P. May.—June.

ORCHIS *latifolia*. *Broad-leaved or Male-handed Orchis.* P. May.—June.

Pleaſley. Mr. Coke.—Cows eat it. Horſes refuſe it.

ORCHIS *maculata*. *Spotted or Female-handed Orchis.* P. June.

Pleaſley. Duffield.—Sheep eat it. Goats and horſes refuſe it. Cows are not fond of it.

ORCHIS *conopſea*. *Red-handed or Sweet Orchis.* Pleaſley. Mr. Coke. P. June.

Goats and cows eat it. Horſes refuſe it.

SATYRIUM *hircinum.* *Lizard Satyrion, or Lizard Flower.* P. June.—July.

Crich. Mr. Coke.

OPHRYS *ovata.* *Common Ophrys, or Twayblade.* P. May.—June.

Newton wood; and near Mr. Eames's, Mackworth.

OPHRYS *apifera.* *Bee Orchis.* *Bee Flower.* P. July.

Matlock. Mr. Coke. In a field oppoſite to the old Bath. Pilkington.

OPHRYS *cordata.* *Leaſt Ophrys, or Twayblade.* P. June.—July.

On the high moor between Chatſworth and Sheffield. Dr. Smith.

SERAPIAS *latifolia.* *Common Marſh Helleborine.* *Baſtard Hellebore.* P. July.

Newton wood; Mr. Coke. Matlock, Mr. Woodward, Pilkington.

SERAPIAS *longifolia.* *White Helleborine.*

Newton wood. Mr. Coke. P. Aug.

This is the ſerapias grandiflora of Dr. Withering.

Claſs XXI.

MONOECIA *MONANDRIA.*

CHIVES and POINTALS SEPARATE. *I. CHIVE.*

ARUM *maculatum*. *Wake-Robin*. *Cuckow Pint*. *Lords and Ladies*. P. April.—May.

Common in hedges.

The root dried and powdered is uſed by the French to waſh their ſkin with, and is ſold at a high price, under the name of Cypreſs powder. It is undoubtedly a good and innocent coſmetic. Dr. Withering.

CAREX *vulpina*. *Great Sedge*. P. May. June.

Common on banks of rivers; Makeney.—Horſes and goats eat it. Swine refuſe it.

CAREX *remota*. *Remote Sedge*. Common.

CAREX *caneſcens*. *Grey Sedge*.

Chee-torr. Mr. Coke. P. June.

CAREX *flava*. *Yellow Seg*.

In marſhes about Duffield. P. June.

CAREX *panicea*. *Pink Seg*.

Breadſall. Mr. Hadley. P. June.

CAREX *ſylvatica*. *Wood Seg*. P. May.

Common in marſhy woods.

CAREX *riparia*. Common. P. April.

CAREX *paniculata* *Panicled Seg*. P. June.

Order IV.

TETRANDRIA. IV. CHIVES.

BETULA *alba. Common Birch tree.* T. May. Very common in the woods of the Peak.— The twigs are very much uſed for making beſoms. The wood is firm, tough, and white. By boring it in the ſpring a ſweet liquor may be obtained, which with the addition of ſugar makes a pleaſant wine.

BETULA *alnus. Alder. Ouler.* T. March. Frequent in moiſt places.—The wood endures a long time under water, and therefore is uſed for pipes. Wooden clogs, and ſhoe-heels are alſo made of it.—Horſes, cows, goats, and ſheep eat it. Swine refuſe it.

URTICA *urens. Leſſer Nettle.* July. Sep. Cows, horſes, ſheep, goats, and ſwine refuſe it.

URTICA *dioica. Common Nettle.* P. July. Ditch banks, and amongſt rubbiſh.

The ſtings are very curious microſcopic objects. They conſiſt of an exceedingly fine pointed, tapering, hollow ſubſtance, with a perforation at the point, and a bag at the baſe. When the ſting is preſſed upon, it readily punctures the ſkin, and the ſame preſſure forces up an acrimonious fluid from the bag, which inſtantly ſquirts into the wound, and produces an effect which moſt perſons have experienced. —A leaf put upon the tongue, and then preſſed againſt the roof of the mouth, is pretty efficacious in ſtopping a bleeding at the noſe.—Paralytic limbs have been recovered by ſtinging them with nettles.—Aſſes are fond of the leaves, and cows eat them in hay; but horſes, ſheep, goats, and ſwine refuſe them.

Order VIII.

POLYANDRIA. MANY CHIVES.

POTERIUM *Sanguiſorba.* *Common Burnet.* Frequent in meadows and paſtures. P. July. The leaves and ſeeds are mildly aſtringent, and have been uſed in dyſenteries and hæmorrhages. Lewis.

QUERCUS *Robur.* *Common Oak.* T. April. The fineſt and largeſt trees, which I have ſeen in Derbyſhire, grow in Hardwick and Kedleſton parks. In the latter there are ſeveral remarkable for their ſize and beauty. One of them in particular is eſteemed the moſt perfect oak in this part of the kingdom. It is calculated to be about 80 feet in height of good timber. Mr. Haywood of Duffield, a conſiderable dealer in timber, by whom I have been fa-

favoured with this calculation, divides the tree into two lengths. The firſt he ſuppoſes to be 45 feet by 51 inches ſquare, and to contain 812 cubic feet. The ſecond length he eſtimates 35 feet by 29 inches ſquare, and to contain 204 cubic feet. The whole tree, excluſive of the branches, therefore amounts to 25½ tons of timber meaſure, or 33 tons, 26 feet neat.—There are other oaks in England, which exceed this in circumference near the ground, and which perhaps contain the ſame quantity of timber, but I believe there are very few, if any, which riſe to equal height with ſo much regularity. Its beauty has however been in a ſmall degree injured by the wind, which has broken off one or two of its largeſt branches.—Mr. Haywood values this tree, if ſound, at 100l. and without aſcertaining this point, he thinks it worth 80l.

Oak ſaw-duſt is the principal indigenous vegetable uſed in dying fuſtian. All the varieties of drabs, and different ſhades of brown, are made with oak ſaw-duſt, variouſly managed and compounded.—An infuſion of the bark, with a ſmall quantity of copperas, is uſed by the common people to dye woollen of a purpliſh blue: the colour, though not very bright, is durable. The bark, on account of its aſtringent property, is ſometimes uſed in medicine with very good effect.—Horſes, cows, ſheep, and goats eat the leaves. Swine and deer fatten on the acorns. Turkies and ducks eat them.

FAGUS *caſtanea.* *Cheſnut Tree.* T. May.

Woods and hedges, but not very common.

The nuts are pleaſant to eat, when roaſted. They are uſed for whitening linen cloth, and for making ſtarch. The wood is applicable to nearly the ſame purpoſes with oak.

FAGUS *ſylvatica.* *Beech Tree.* T. March.

It is very beautiful when ſtanding ſingle in parks or ornamental grounds. The nuts, when eaten, occaſion giddineſs and head-ach; but dried may be made into wholeſome bread.

CORYLUS *avellana.* *Common Hazle-Nut Tree.* T. March. April.

Frequent in woods and hedges.

Painters and engravers make uſe of charcoal prepared from the wood.—An expreſſed oil is procured from the nuts for the uſe of painters.

Goats and horſes eat the leaves, ſheep and ſwine refuſe them.

Claſs XXII.

DIOECIA *DIANDRIA.*

CHIVES and POINTALS DISTINCT. *II. CHIVES.*

SALIX *alba.* *Common Willow.* T. April. The bark of this tree has been found a very uſeful medicine in agues. Many perſons have been cured by taking a dram of the powdered bark every 4 hours during the intermiſſion. In a few obſtinate caſes it was found neceſſary to mix a fifth part of Peruvian bark. The bark ſhould be gathered when it is full of ſap, and dried by a gentle heat. *Phil. Tranſ. v.* liii. *p.* 195.

Order III.

TRIANDRIA. III. CHIVES.

EMPETRUM *nigrum.* *Black-berried Heath, Crow Berries.* On the moors. S. April. The berries are ripe in Auguſt and September, and are eaten by grouſe.—Goats are not fond of the plant. Cows, ſheep and horſes refuſe it.

Order IV.

TETRANDRIA. IV. CHIVES.

VISCUM *album.* *White Miſſeltoe.* S. May. Pinxton, Alleſtry, Weſt-Hallam.

Sheep eat it very greedily, and it is frequently cut off the trees for them in hard weather. It is ſaid to preſerve them from the rot. Mr. Hollefear.—If the berries, when fully ripe, be rubbed on the ſmooth bark of almoſt any tree, they will adhere cloſely and produce plants the following winter.——Miſſeltoe was formerly in great repute as a remedy for convulſive and other complaints; but it is now very much diſregarded, its medicinal powers being ſmall, and its operation uncertain.

MYRICA *gale.* *Sweet Willow.* T. May. Common about Wingerworth. Mr. J. Martin.

Horſes and goats eat it. Sheep and cows refuſe it.——Gathered in the autumn it dyes wool yellow. Linn.—The Welſh make uſe of it for the ſame purpoſe. They alſo lay branches of it upon and under their beds to keep off the fleas and moths, and give it as a vermifuge in powder and infuſion, and apply it alſo externally to the abdomen. *Penn. Wales.* *v.* ii. *p.* 177.

Order

Order V.

PENTANDRIA. V. CHIVES.

HUMULUS *lupulus.* *Hops.* P. June.
In hedges. Pinxton; Duffield.

The young ſhoots are often eaten early in the ſpring as aſparagus, and are ſold under the name of hop-tops.—Strong cloth is made in Sweden from the ſtalks. For this purpoſe they muſt be gathered in autumn, ſoaked in water all winter; and in March, after being dried in a ſtove, they are dreſſed like flax.——Horſes, cows, ſheep, goats, and ſwine eat it.

Order VI.

HEXANDRIA. VI. CHIVES.

TAMUS *communis.* *Black Briony.* P. June.
In hedges. Derby; S. Normanton.

The young ſhoots are ſaid to be good eating when dreſſed like aſparagus.—The root is acrid and ſtimulating.—Horſes will not eat this plant.

Order VIII.

OCTANDRIA. VIII. CHIVES.

POPULUS *tremula.* *Aſp.* *Aſpen.* T. April.
S. Normanton; Markeaton; Derby.

As its roots ſpread near the ſurface, it impoveriſhes the land, and prevents the graſs from growing near it.—The wood is extremely light, white, ſmooth, woolly, ſoft, and durable in the air—Sheep and goats eat the plant. Horſes and ſwine refuſe it.

ENNEANDRIA. IX. CHIVES.

Mercurialis *perennis.* *Dog's Mercury.* Pinxton; Coxbench; Mackworth. P. May. It is noxious to ſheep, and deleterious to man. Sheep and goats it. Cows and Horſe refuſe it.

Order XIII.

MONADELPHIA. THREADS UNITED.

Taxus *baccata.* *Yew Tree.* T. April. It grows, in acceſſible ſituations, on the rocks at Matlock and Dovedale, and in a ſcattered manner in other parts of the county. The largeſt I have ſeen growing wild are ſituated on Smalley Common.—The wood is hard, ſmooth, and beautifully veined with red.—The freſh leaves are fatal to the human ſpecies; but the berries may be eaten without injury.—Horſes and cows have been killed by eating it. The bark is ſaid to be equally noxious to ſheep.

Order XIV.

SYNGENESIA. TIPS UNITED.

Bryonia *dioica. Bryony. Wild Vine.*

Frequent in hedges. Derby; S. Normanton. P. May. June.

The root is purgative and acrid; a dram of it in ſubſtance, or half an ounce of it infuſed in wine is a full doſe. A cold infuſion of the root in water is uſed externally in ſciatic pains. A cataplaſm of it is a moſt powerful diſcutient. —A decoction made with a pound of the freſh root is the beſt purge for horned cattle.—The degree of its activity in different ſtates and forms being very variable, and leſs aſcertained than that of other cathartics in general uſe, is one reaſon why it is rarely employed: but Dr. Withering thinks it deſerving of more attention than has been hitherto beſtowed upon it.—Goats eat it. Horſes, cows, ſheep and ſwine refuſe it.

Holcus *mollis. Creeping Soft-graſs.*

South Normanton. P. Aug.

Claſs XXIII.

POLYGAMIA *MONOECIA.*

VARIOUS DISPOSITIONS.

Valantia *cruciata. Common Croſs-wort.*

Pinxton. P. April.

Pare-

PARIETARIA *officinalis*. *Pellitory of the wall.* Frequent on walls. Mackworth church; Swarkſtone-bridge. P. May.—Sept.

This plant was formerly in repute as a medicine, but it does not ſeem to poſſeſs any remarkable qualities. It is ſaid to contain a conſiderable quantity of nitre.

ATRIPLEX *haſtata*. *Fat-hen*. *Lamb's Quarters*. Common on rubbiſh. A. Auguſt.

Cows, goats, ſheep and ſwine eat it, but do not ſeem very fond of it.

ATRIPLEX *patula*. *Spear Orache*. Common on ditch banks. A. Auguſt.

ACER *pſeudo-platanus*. *Sycamore*. T. June.

By boring a hole in the body of the tree in the ſpring, a ſweet liquor may be obtained, which with the addition of water is ſometimes made into wine.—The wood is ſoft and very white.

ACER *campeſtre*. *Common Mapple*. T. June. Pinxton.—The wood is well adapted to the uſe of the turner.

FRAXINUS *excelſior*. *Common Aſh*. T. Apr.

An infuſion of the leaves, from half an ounce to an ounce and half is a very good purge, and a decoction of two drams of the bark, or of ſix drams of the leaves has been uſed to cure agues.—Horſes, cows, ſheep and goats eat it, but it ſpoils the milk of cows.—The wood is hard and tough, and is much uſed to make the tools in huſbandry.

Claſs XXIV.

CRYPTOGAMIA.

FLOWERS INCONSPICUOUS.

EQUISETUM *fluviale.* *River Horſetail.* Newton wood.

OPHIOGLOSSUM *vulgare.* *Common Adder's Tongue.* Dethick; Mr. Coke.

OSMUNDA *lunaria.* *Moonwort.* Dethick; Mr. Coke.

FILIX *mas.* *Male Fern.* Common.—The Siberians boil it in their ale and like the flavour of it. The root dried, powdered, and given in doſes of half an ounce was a ſecret to kill the tape worm, and is ſuppoſed to be no leſs efficacious in deſtroying other worms.—A tolerably pure alkali is obtained form from the aſhes. The common people in many parts of England mix the aſhes with water, and form them into balls; theſe balls are afterwards made hot in the fire, and uſed to make lye for ſcouring linen.

FILIX *feminina. Female Polopody, or Fern,* Common at Wingerworth.

ASPLENIUM *ruta muraria. White Maiden Hair.* Dovedale; Matlock; Dr. Johnſon. St. Peter's church, Derby.

ASPLENIUM *trichomanes. Common Maiden Hair.* Dovedale; Dr. Johnſon. On a wall at Quarndon.

ASPLENIUM *viride. Green Maiden Hair.* Coxbench wood; Dr. Johnſon. P.

ASPLENIUM *ſcolopendrium. Harts-tongue.* Matlock; Littleover.

POLYPODIUM *vulgare. Common Polypody.* Frequent on oak trees, and walls.

Order II.

MUSCI MOSSES.

LYCOPODIUM *alpinum. Mountain Club-Moſs.* On the mountains near the Derwent; Mr. J. Martin.

SELAGO *abietis*. *Fir Club Moſs*. On the mountains near the Derwent; Mr. J. Martin.

BRYUM *hynoides*. *Hoary Bryum*.
On the mountains; Mr. J. Martin.

Order III.

ALGÆE. FLAGS or THONGS.

LICHEN *ſaxatilis*. *Stone Liverwort, or Cupthong*. Frequent on rocks.——It is uſed to dye purple.

LICHEN *caperatus*. *Roſe-leaved Liverwort*.
Coxbench; Dr. Johnſon.—It is uſed to dye woollens of an orange colour.

LICHEN *corallinus*. Frequent; Coxbench.

LICHEN *parietinus*. *Common Liverwort*.
Frequent on walls and trees.

LICHENS *ſtellaris*. *Starry Cupthong*.
On trees near Coxbench.

LICHEN *floridus*. *Flowering Cupthong*.
Not very common; on a wall betwixt Derby and Coxbench. Dr. Johnſon.

LICHEN *lactæus*. Frequent.

LICHEN *coxiferus*. Nov.—Feb.

LICHEN *corniculatus*. *Horned Liverwort*.

LICHEN *cornicupioides*. *Radiated Liverwort*. Feb.

LICHEN *rangiferinus*. *Reindeer Liverwort.*

The Laplanders could not exiſt without this plant. It is the food of the rein-deer; and the rein-deer ſupplies every neceſſary of life for the contented people of that inhoſpitable climate.

The four laſt were found on Breadſal moor by Dr. Johnſon.

LICHEN *candelarius*. *Yellow Liverwort.*

On a wall betwixt Holbrooke & Coxbench. Dr. Johnſon.—It gives a yellow colour.

LICHEN *cærul.-nigreſcens.*

LICHEN *violaceus.*

LICHEN *caninus*. *Aſh-coloured ground Liverwort.*——This is the baſis of the famous powder recommended by Dr. Mead to prevent madneſs after the bite of a mad dog, and inſerted in the London Pharmacopæia. But Dr. Lewis obſerves, the ſucceſs depends more upon the uſe of the cold bath, which is preſcribed along with it, than the efficacy of this plant.

LICHEN *miniatus*. *Cloudy Liverwort.*

The four laſt found at Dovedale by Dr. Johnſon.

LICHEN *verrucoſus*. *Black worted Liverwort.*

Derbyſhire; Dillen.

LICHEN *tartareus*. *Welch Liverwort.*

On rocks, common.——It is gathered for dyers, and gives a purple colour.

Lichen *petræus, purpureus.* *Purple Liverwort.* On rocks.—It dyes wool of a dull but durable crimſon, or purple colour.—It has been uſed as a ſtiptic.

Lichen *corneus.* *Hairy Cupthong.*
Derbyſhire; Dillen.

Order IV.

FUNGI. MUSHROOMS.

Agaricus *campeſtris.* *Common Muſhroom.*
Frequent.

Clavaria *corraloides.* *Yellow Clubtop.*
Dry paſtures; Quarndon.

PLANTS OMITTED.

Claſs IX.——Order III.

Butomus *umbellatus.* *Flowering Ruſh. Water Gladiole.* P. July.
Banks of the Trent.

Claſs XII.——Order V.

Rubus *cæſius.* *Dew-berry Buſh. Wheat Berry.* S. July.
Woods and hedges; Derby; Mackworth.

CHAP. IX.

Birds.

ORNITHOLOGY, like other branches of natural hiſtory, has met with conſiderable attention in this kingdom as well as in other parts of Europe. Meſſrs. Willughby, Ray, Edwards, Latham, and Pennant in particular have applied to the ſtudy of it with peculiar diligence and ſucceſs. The laſt-mentioned gentleman more eſpecially has given ſo ample and accurate a deſcription of the birds found in Great Britain, that very little additional light can be thrown upon the ſubject by the hiſtory of thoſe, which are met with in any particular diſtrict of the kingdom. However it may not be entirely uſeleſs to give a catalogue of ſuch, as have been obſerved in Derbyſhire. By this means the place of abode of each bird will be more clearly aſcertained, and this part of their hiſtory better illuſtrated, than it has hitherto been. It is not my intention to give a full deſcription of any bird, but to mark only the character, in which they differ from thoſe, given by other writers. Nor ſhall I be ſolicitous given by other writers. Nor ſhall I be ſolicitous about the accuracy of the arrangement, referring thoſe who wiſh to be more fully informed in reſpect to this point, to Mr. Pennant's valuable work, entitled Britiſh Zoology.

We have no certain evidence, that any ſpecies of eagle beſides the black or ring tailed has ever been ſeen in Derbyſhire. Mr. Willoughby ſays, that in the year 1668 in the woodlands near the river Derwent in the Peak of Derbyſhire was found an eagle's neſt made of great ſticks reſting one end on the edge of a rock, the other on two birch trees, upon which was a layer of ruſhes, and over them a layer of heath, and upon the heath ruſhes again, upon which lay one young one, and an addle egg, and by them a lamb, a hare, and three heath poults. The neſt was about two yards ſquare, and had no hollow in it. The young eagle was black as a hobby, of the ſhape of a goshawk, of almoſt the weight of a gooſe, rough footed or feathered down to the foot, having a white ring about the tail.

Though the eagle has been ſeen at a later period, it cannot be conſidered in any other light than as an occaſional viſitor in this county. About the year 1720 one was taken up in the pariſh of Gloſſop, upon the high mountain called Kinderſcout. It was found in a very feeble ſtate. This was thought to have been occaſioned by the inclemency of the weather, as it afterwards recovered, and was carried about the country and ſhewn as a natural curioſity.

About 30 years ago another eagle was ſeen in Hardwick park. This, I believe, is the laſt, which has been obſerved in Derbyſhire. But I have been informed, that in the year 1782 two eagles were ſeen in Shirewood foreſt in Nottinghamſhire, which is only a few miles diſtant from Hardwick.

Happy is it, that the eagle is become ſo ſcarce a bird in this part of the kingdom. For I have been credibly informed, that in the mountainous part of Weſtmoreland, in which it ſtill makes its appearance, the ſhepherd generally loſes, in the ſpring and ſummer ſeaſons, a lamb every week. Mr. Pennant ſays, that it is frequent in Scotland, and that it is very deſtructive to deer. It ſeizes them between the horns, and by inceſſantly beating them about the eyes with its wings ſoon makes a prey of the haraſſed animal. He adds, that the eagles in the iſland of Rum have nearly extirpated the ſtags, which uſed to abound there.

The oſprey is ranked by Mr. Pennant with the eagles. It has been twice ſeen in Derbyſhire.——On the 28th of May, 1779, one was ſhot at Stavely, near Cheſterfield. By an attention to the following particulars it will be found, that it varies a little from Mr. Pennant's deſcription of this bird. It was in good condition, had an empty ſtomach, and weighed 59 ounces. The wings extended meaſured from tip to tip five feet 6 inches and a half. The legs ſhort, but the thighs pretty long. The talons ſemicircular and nearly of equal length. The tender ſides of the feet and toes remarkably covered with horny points for the better ſecurity of its prey. The outer toes ſo moveable, as to form a ſecond kind of toe, or a third forwards, as in owls. Not the leaſt appearance of the left foot being ſubpalmated as mentioned by Linnæus. The feathers on the thighs white, not long, and reaching very little below the knees. The wings and talons remarkably ſtrong and long.

The above bird was preſented to Sir Aſhton Lever.

The other oſprey was ſhot October 1785, at Melbourn. It agrees ſo much with the bird killed at Stavely, as to render it unneceſſary to take more particular notice of it.

Perhaps there is a greater variety of falcons found in Derbyſhire, than in the ſame extent of country in any other part of England. Beſides the kite, common buzzard, keſtril, and ſparrow hawk, the following ſeem to be more particularly deſerving of notice.

The merlin has been ſhot at Stavely. It is one of the ſmalleſt of the hawks. It weighs only five ounces and a half. It does not breed in England but emigrates hither in October.

The honey buzzard ſhot at Aſton. I have not ſeen or heard of more than one bird of this ſpecies. It had no aſh colour on the head. Mr. Willoughby gave it this name, becauſe he found the combs of waſps in its neſt.

Moor buzzard at Catton in the pariſh of Croxal and at Foſton.

The ring tail ſhot on the eaſt moor and near Derby.

The hen harrier ſhot at the ſame places. Mr. Pennant obſerves, that the ring tail has been ſuppoſed to be the female of this ſpecies, but is himſelf of a different opinion. He ſays, that by the infallible rule of diſſection males of the ring tail have been found. As a further confirmation of the juſtneſs of this remark, I would obſerve, that two ring tails, which I have ſeen, from their different ſize, and plumage, appeared to be a male and female. The colour of the feathers in the larger bird was brighter and deeper than thoſe in the other.

A ſpotted falcon was ſhot in the month of November at Spondon. Another bird of the ſame ſpecies was ſeen ſeveral months before in company with it.—The length was twenty-one inches, and breadth forty-ſeven. The crown and hind part of the neck white, ſpotted with dark brown. Back and ſcapulars of the ſame colour edged with white. Under ſide white, tinged with yellow. Twelve feathers in the tail. The upper ſide duſky and barred with dark brown. The middle feathers barred with white on the under ſide near the rump.

The above birds were obſerved to frequent much the banks of the river Derwent.

I have ſeen another ſpecies of falcon, which ſeems to be diſtinct from any of thoſe, which have now been enumerated. It was rather larger than the common buzzard, and, excepting the tail and under ſide of the primary feathers, was entirely of a dark chocolate colour. The tail duſky brown marked with three blackiſh bars, (that near the end broader than the other two) and with a white ſpot cloſe to the rump. The under ſide of the firſt feathers of the wing dirty white. The tail long, extending three inches beyond the ends of the wings. The bill ſtrong, and very much hooked at the end. The legs ſhort and covered with feathers almoſt to the feet.—It was ſhot in the woods at Alderwaſhley.

Mr. Pennant in his account of the white owl does not mention the colour, ſize, and number of its eggs. The hen was found at Stavely ſitting upon two long white eggs larger than thoſe of a wood pigeon. The male weighs only thirteen ounces

The long eared owl has been ſhot at Shardlow. It agrees with that deſcribed by Mr. Pennant, excepting that the breaſt is of a darker colour than the under ſide.

Short eared owl ſhot at Melbourn.

Theſe two ſpecies are ſcarce, more eſpecially the latter. It avoids inhabited places. It is a bird of paſſage; viſiting this kingdom the beginning of October, and retiring early in the ſpring.—I have been informed, that the hawk headed owl has been ſhot at Stavely and Derby. But, not having ſeen the bird, I am not able to ſay whether it be diſtinct from thoſe, which have been enumerated.

The white, the brown, and the tawny or ſcreech owl are all common in Derbyſhire. The female of the laſt ſpecies weighed only thirteen ounces.

The greater and ſmaller butcher bird or ſhrike ſhot at Derby. The male of the latter ſpecies weighed only an ounce. Whereas Mr. Pennant ſays it weighs two.—The raven, rook and carrion crow are common. The hooded or Royſton crow is ſometimes ſeen, but is not very common in Derbyſhire.—Jackdaws frequent the rocks of the Peak.

The cuckow and wryneck viſit this county at the ſame time they make their appearance in other parts of the kingdom.—Jays and magpies common. A magpie was lately ſhot at Markeaton, entirely white, excepting a few feathers in its tail.

The greater and ſmaller ſpotted woodpecker ſhot at Stavely and Melbourn. The green woodpecker is common.

Kingfiſher not unfrequent.

Nuthatch ſhot at Romely near Bolſover and at Melbourn. In ſhape it reſembles the woodpecker, and lives upon inſects and nuts.

The creeper at Derby. Excepting the golden creſted wren, it is the ſmalleſt of Britiſh birds.

The black cock was ſhot a few years ago on Egginton heath. Formerly theſe birds appeared in great number in the Peak, but now are very ſeldom ſeen.

The red grouſe found upon all the moors in Derbyſhire.

Partridge common.

The quail is ſometimes ſeen in Derbyſhire. Mr. Pennant calls it a bird of paſſage. Some, he obſerves, entirely quit our iſland, and others only ſhift their quarters in the winter ſeaſon.

The common pigeon or ſtock dove frequent.

The rock pigeon has been ſeen on the Chevin near to Duffield. It is ſaid to be a bird of paſſage, and only to viſit this kingdom during the winter months.

Stare or ſtarling common.

Miſſeltoe thruſh, and field fare not uncommon during the winter.—The throſtle regularly viſits Derbyſhire every ſpring.

I have ſeen a bird, which was ſhot at Thulſtone in the pariſh of Elvaſton, that in ſize and figure greatly reſembled a throſtle. Its length eight inches; its legs very long and ſlender. Entirely white, excepting the feathers under the wings, which were tinged with reddiſh

diſh orange. This bird was ſhot in the beginning of Jan. 1786, and is the only one of the kind, which I have ſeen or heard of.

The water ouzel is frequently met with in the Peak, near ſmall brooks and rivulets.

The ring ouzel has been ſeen on the eaſt moor and at Pinxton.

The roſe coloured ouzel was ſhot in October 1784, by the Rev. Mr. Dawſon at Weſton, and is now in his poſſeſſion. It agrees very nearly with that deſcribed by Mr. Pennant. I would only obſerve, that the roſe colour is faint and dull, and that the creſt is not ſo large, or raiſed ſo high, as in the drawing given by the above gentleman.—This bird is ſeldom ſeen in England, or any other part of Europe.

The Bohemian chatterer ſome years ago was ſhot at Glapwell in the pariſh of Bolſover. At a later time a flight of 14 birds was ſeen at Smalley and Melbourn; ſome of them were ſhot at both places. At Melbourn they were obſerved to eat the food, which had been given to ſome ſwine.

This bird is ſaid to appear very ſeldom in England, but annually to viſit the neighbourhood of Edinburgh, and feed upon the berries of the mountain aſh. Its native country is Bohemia, from whence it wanders over Europe.

The haw groſbeak has been ſhot at Spondon Stavely, and Melbourn. This bird viſits us only at uncertain times, and is not regularly migrant. In that, which I ſaw, I could not diſcover any ſhade of pink upon the head.

The croſs bill has been ſeen at Stavely and Derby. About thirty years ago a large flight of theſe birds appeared in the orchards at the latter place. They were ſo tame, that a great number was taken with bird lime at the end of long poles. Some of them were kept in cages, and lived a year. During this time they were obſerved to change their colour.

I have lately ſeen a croſs bill which in colour differs from thoſe, which are mentioned by Mr. Pennant. The feathers upon the head dark brown, edged with a light grey. Scapulars, back, but more eſpecially the rump, tinged with a whitiſh yellow. The feathers in the wing and tail dark brown, edged with the ſame light colour. The breaſt and belly of a pale aſh colour, marked with ſmall oblong ſpots. The tail conſiſted of twelve feathers, and was a little forked.

Birds of this ſpecies are regular inhabitants of Switzerland and Germany.

The bullfinch or alp, the brown bunting, the yellow hammer, and reed ſparrow, are common.

The chaffinch and goldfinch are common.

Bramling ſhot at Stavely and Melbourn. Several have been ſeen at the latter place.

Houſe and hedge ſparrows are common. The brown and the red headed linnets not unfrequent.

The fly catcher has been obſerved at Stavely to build its neſt upon the hanging of a garden gate, and at Derby in a vine for ſeveral years together. Its eggs greatly reſemble thoſe of the redſtart, but are rather more ſpotted, and about a third ſmaller. It appears in the ſpring, breeds with us, and retires in Auguſt.

The ſky, the wood, and the tit lark common. The grey water wagtail common; but the yellow not ſo frequent.

The nightingale is ſometimes ſeen on the north eaſt borders of the county. It has been obſerved in the pariſh of Creſwell in particular. It appears in the ſpring, and continues a few months.

The redbreaſt very common.

The redſtart, which is a bird of paſſage, is ſeen in the ſpring and ſummer ſeaſons.

The petty chaps has been ſhot at Stavely.

The yellow or willow wren, common.

Golden creſted wren at Romely wood near Bolſover, and at Melbourn. This is the ſmalleſt Britiſh bird. Mr. Pennant ſays it weighs only ſeventy-ſix grains.

The common wren frequent.

The white ear is ſeen upon ſtone walls throughout the hilly parts of Derbyſhire, more eſpecially in the high Peak.

The whin chat and ſtone chatter, or ſtone ſmich, are common in the ſame place with the preceding; but like it they quit the country in the winter ſeaſon.

The white throat appears in the ſummer ſeaſon in moſt parts of the county.

The houſe ſwallow, the ſwift, the martin, common during the ſpring and ſummer ſeaſons.

The goat ſucker has been ſhot at Shuttlewood, and Sinfin moor near Derby. Mr. Pennant ſays, it appears the latter end of May, and diſappears in the northern parts of our iſland the latter end of Auguſt. But its ſtay in Derbyſhire is later. For that ſhot on Sinfin moor was killed 18th of September, 1780.

The great blue, the cole, and the long tailed titmouſe, not uncommon.

WATER FOWLS.

Common heron frequent.——Bittern not ſo common.

The curlew is ſometimes, tho' not frequently ſeen in Derbyſhire.

The woodcock is common in every part, but more eſpecially in the north-weſt extremity of the county.

The godwit is not, I believe, often ſeen in Derbyſhire. A few years ago, one was ſhot at Barlborough, and another on Sinfin moor.

The red ſhank has been ſhot at Stavely.

Lapwing ſhot at Derby.

The grey ſand piper has been ſhot at Tideſwell, and on Sinfin moor. It is not a very common bird in England.

Ruff and Reeve, Sinfin moor.

Spotted ſand piper, Stavely.

Ringed plover, Derby, Feb. 1786.

Golden plover at Sinfin moor.

Kittiwake, Chelaſton and Bretby, Dec.

Sanderling at Stavely.

Dotterell, in the Peak. It appears in the ſpring, and ſtays about ſix or eight weeks.

Oyſter catcher or ſea pie, Derby.

Water rail, Stavely.

Corn crake or land rail, common.

Moor hen not unfrequent.

The grey ſcollop toed ſand piper at Stavely. I believe this bird is not very common.

Coot, frequent.

Tippet grebe, Oſmaſton. It is a ſcarce bird.

Duſky grebe, Derby.

Leſſer grebe or dipper, Stavely.

Puffin or fire eyed grebe has been ſhot near Derby. This bird is ſeldom ſeen in an inland part of the kingdom.

The great grey gull, Sinfin moor.

Black headed gull or pewit, the ſame place.

The greater and leſſer tern, Sinfin moor.

The gooſander does not often appear in Derbyſhire. Two have been ſhot near the river Derwent, one at Twiford, and the other at Catton in the pariſh of Croxal.

Red headed ſmew at Stavely. I have ſeen two birds apparently of this ſpecies ſhot near Derby, which in their marks differed from that deſcribed by Mr. Pennant. The head ſlightly creſted, and of a bright ruſt colour, without any white upon the cheek, or black ſpot from beyond the eyes to the bill.

Wild ſwans ſometimes viſit the rivers Trent and Derwent in ſevere ſeaſons.

The white fronted gooſe in ſevere ſeaſons is ſeen upon the Trent and Sinfin moor.

The bernacle is ſeldom ſeen in Derbyſhire. I have heard of one, which was ſhot at Barlborough.

Pochard or dun bird at Melbourn. April.

I have been informed, that the Brent gooſe is ſometimes ſhot upon Sinfin moor. The velvet duck, the golden eyed duck, and the ſhiel drake, are ſaid to be occaſionally met with at the ſame place.

I have been informed, that the long tailed duck has been ſhot upon Sinfin moor, but it is ſeldom ſeen in this part of the kingdom.

The white throated and Garganey ducks are ſaid ſometimes to viſit Sinfin moor.

The cormorant is ſometimes, though not frequently, ſeen in Derbyſhire.

The following bird was ſhot in a ſevere froſt near Stavely, but does not appear to be deſcribed by Mr. Pennant.

In plumage it bears the greateſt reſemblance to the golden eye of any of the ſpecies of ducks. But as Mr. Pennant ſays, the golden eye weighs 32 ounces, and this bird weighed only 22½, and as the length of the golden eye is ſaid to be 19 and the breadth 31 inches, and the two correſpondent proportions of the bird in queſtion were only 16 and 26, they ſeem to be of different ſpecies. Two of theſe birds have been ſhot near the ſame place. The latter weighed only 19 ounces. It was killed the ſixth ſhot, having by its quickneſs of eye, and power of diving, eluded 4 or 5 fair ſhots on the ſurface of the water; for it would on no account be made to take wing: And probably it would not have been killed, had not a ſecond perſon obliged it to go under water ſeveral times ſucceſſively, and the ſhot ſtruck it inſtantly on its emerging.

END OF THE FIRST VOLUME.

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